

Chemical Week

January 26, 1957

Price 35 cents



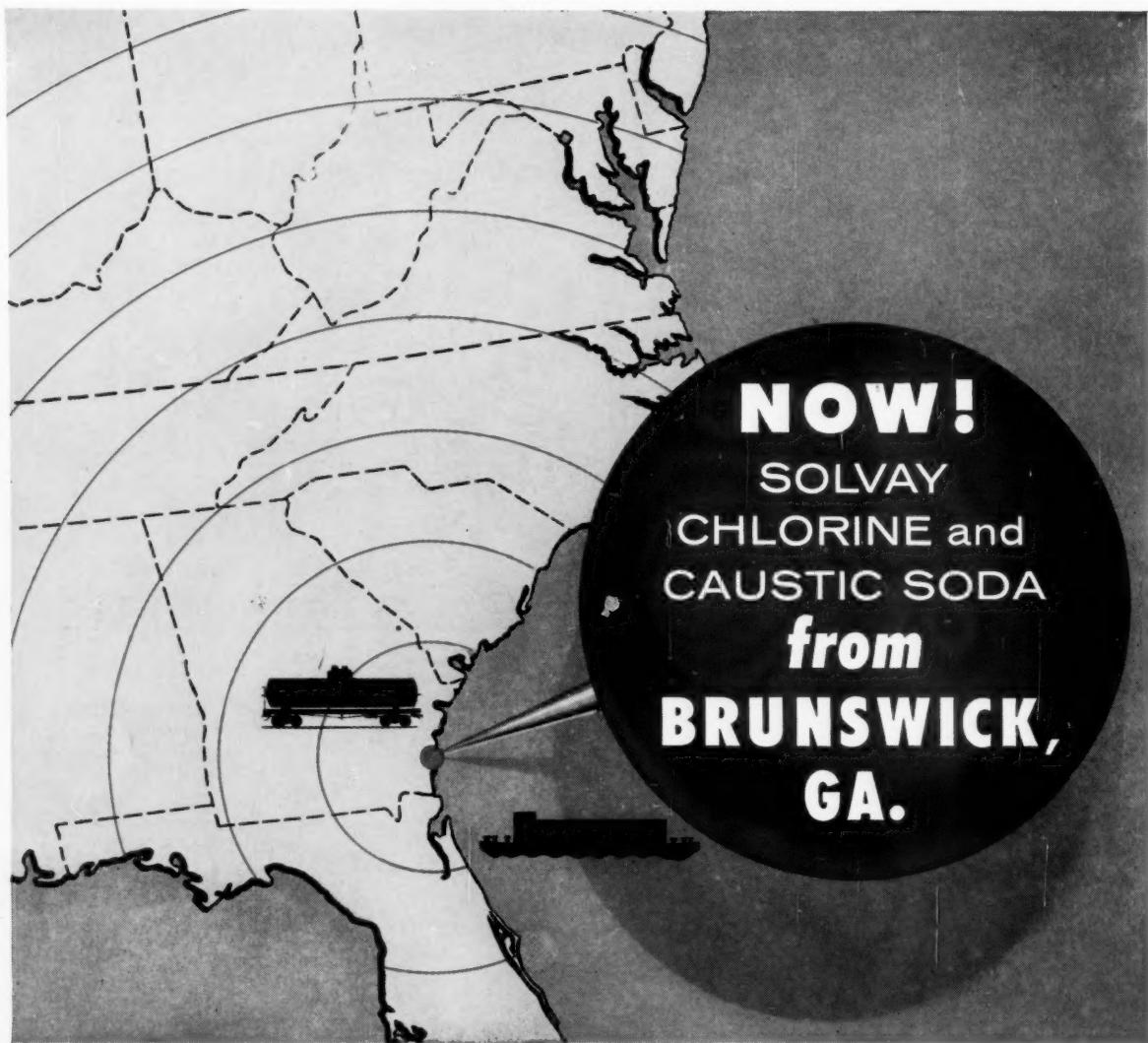
Taxes are on Congress's calendar.
Outlook: no cuts this year, but some relief in '58 p. 21

Drug firms switch to metric measure—and that means new problems for their chemical suppliers . p. 48

◀ **Hoffmann-La Roche's Isler: His carotene synthesis uncorks new food-color competition . . . p. 66**

Low-pressure polyethylene race nears climax; 380-million-lbs./yr. capacity is due in '57 . . . p. 82

◀ **Stearns-Roger's Denver headquarters: base for process pioneering in uranium ore, oil shale . . . p. 98**



Newest Solvay plant means lower costs
... faster service for Southern users

The addition of Brunswick, Ga. as the newest of SOLVAY's strategically located production centers results in quicker deliveries and lower freight rates for Southeastern chlorine and caustic soda users. Liquid caustic soda will be shipped in tank cars and barges, liquid chlorine in single-unit tank cars. Your nearest SOLVAY branch office will give you information on deliveries from this new SOLVAY source.

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This particular case history concerns a power company with a forward-looking operations manager. But,

Dowell has other startling performance data to show you—from your own industry. That's because chemical cleaning is so versatile. Dowell engineers are experts in removing scale and sludge from process systems, tanks and piping. They apply solvents in various ways—such as filling, jetting, cascading. Dowell furnishes all the necessary chemicals, trained personnel, pumping and control equipment.

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have Dowell clean it chemically



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MHI SODIUM HYDRIDE IN OIL PROVIDES DEFINITE PRODUCTION ADVANTAGES

For condensation, alkylation, transesterification and carbethoxylation steps, MHI sodium hydride oil dispersion makes obsolete many of the ordinary reagents such as methylate, sodamide and sodium metal. Its basicity lies between NaOCH_3 and NaNH_2 , yet it condenses many esters. NaOCH_3 cannot accomplish effectively, and does so in less reaction time, at lower temperatures and with higher yields.

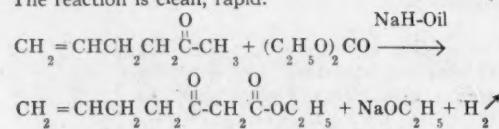
A 25% or 50% dispersion of NaH in Bayol 85, an industrial white oil, can be handled with complete safety without hydrolysis in air. It can be pumped, metered or screw fed. Will not form an alcohol as a by-product as does methylate—therefore, no forcing techniques are necessary.

MHI sodium hydride-oil dispersion compares price-wise with sodamide and sodium methylate, yet, unlike sodamide, NaH will not attack ester groups and form amides. It will not cause reductive condensation as does sodium metal and it is easier to handle than either sodium metal or sodamide.

Here Are A Few Profitable Applications

ALLETHRIN (insecticide):

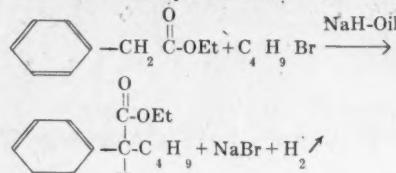
An intermediate step in the Allethrin synthesis can be performed by NaH -oil in a condensation reaction. Allyl acetone and diethylcarbonate when reacted with NaH -oil form the product ethyl-3-oxo-6-heptenoate. The reaction is clean, rapid.



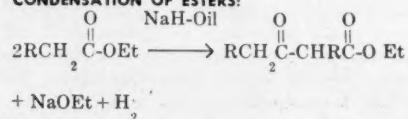
The evolved H_2 , if accurately measured, provides a means of following the extent of reaction.

ALKYLATION OF ESTERS WITH ALKYL HALIDES AND NaH -OIL:

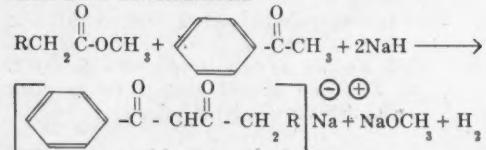
This can be accomplished by running the reaction at low temperatures in THF or a more polar solvent such as "diglyme"—dimethyl ether of diethylene glycol. The alkyl halide should be present at the start of the reaction. The technique cannot be used with Na metal.



CONDENSATION OF ESTERS:



KETO-ESTER CONDENSATION:



Complete technical information is available upon request.



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Chemical Week

TOP OF THE WEEK

January 26, 1957

Here's how process firms rate in patent ownership. Some 54 received over 300 each in 17-year periodp. 24

Kansas City's Thompson-Hayward Chemical has an individualistic recipe for growth as distributor: ...p. 42

Want some extra specialty business this winter? You can combat the usual winter slump in retail sales by selling to mail order housesp. 52

Cyclosteel process attracts attention: iron ore goes into the reactor and steel comes outp. 94

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Ansul answers critics of its management methods, points to its plans for '57

24 Why is industry dissatisfied with the International Labor Organization? Study shows U.S. government may be to blame

25 Government subsidy may be answer to high cost of atomic insurance
Dow-bound benzene goes up in flames in freezing weather

27 CHARTING BUSINESS

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SOCMA task forces seek to prove need for better data on imports, production

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58 Encephalographic research is one way Airkem hopes to better its booming sales record

66 RESEARCH

Hoffman-La Roche duplicates natural food colors via total synthesis

72 Cheaper polyethers may take polyesters' place in urethane foams
More basic research is asked by Perkin medal winner Seaborg

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82 MARKETS

Low pressure polyethylene is starting to go commercial, 380 million lbs./year capacity will be on-stream during '57

89 MARKET NEWSLETTER

94 PRODUCTION

98 Stearns-Roger is booming and sees room for further growth in nuclear and chemical processing fields

The Bio-Chemical Department



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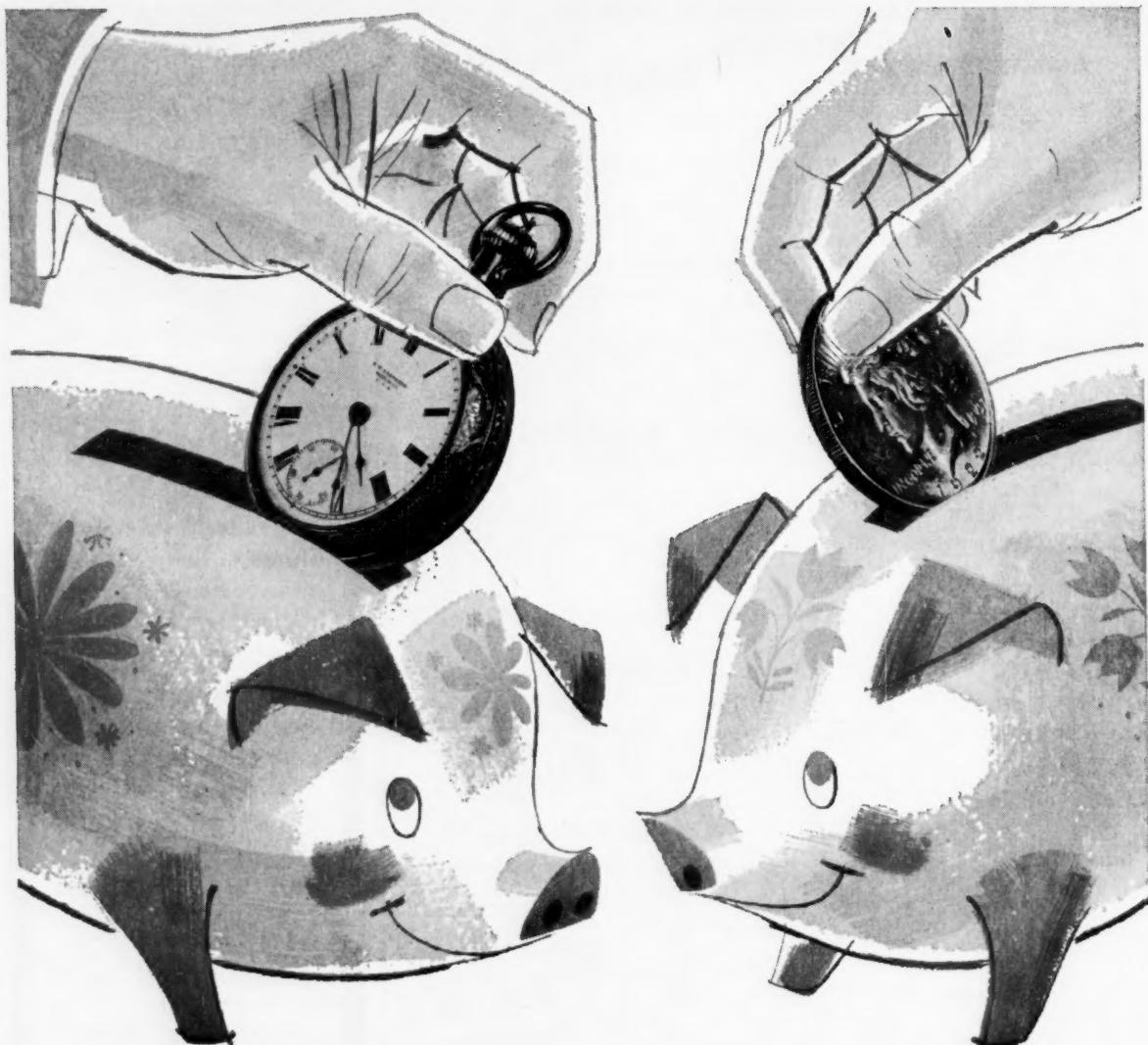
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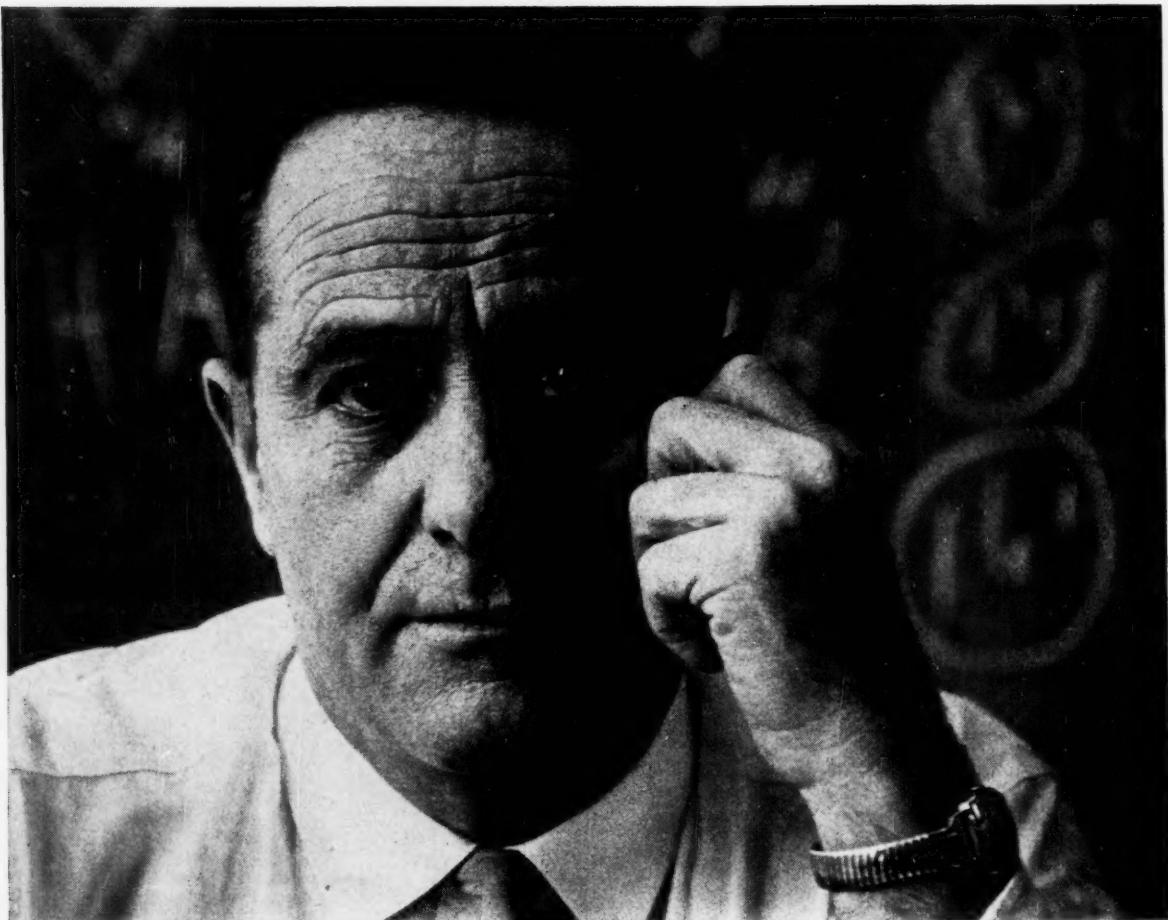
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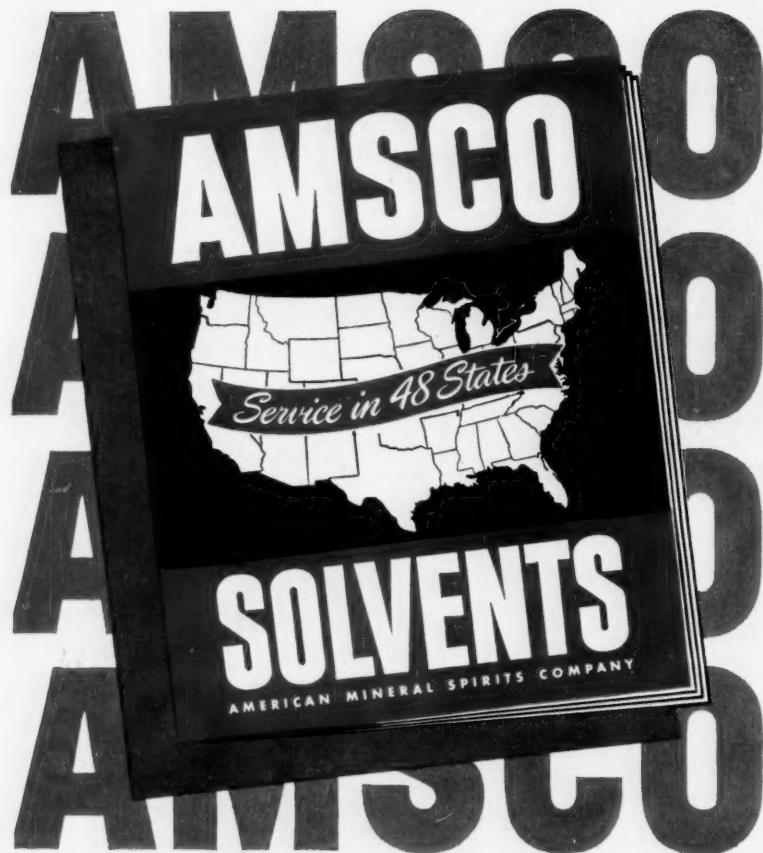
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OPINION

Fire's Intangible Take

TO THE EDITOR: My attention was called to your article on fire-retardant paints (Dec. 1), and I was struck by a paragraph in this story which reads as follows: "Most companies are well protected by fire insurance, often even carry insurance against lost production, and thus have little financial fear of fire."

The idea that fires are only of concern to the fire-insurance companies is one that we have been combating for a long time, and I hate to see a statement like this appearing in your magazine. It is seldom, if ever, that a reputable concern gains anything from a fire. The indirect losses from fire that are not insured are often very substantial. I am thinking of loss of production, inability to satisfy customers, loss of records, and many other intangibles that often add up to very much more than the actual fire destruction itself.

PERCY BUGBEE
General Manager
National Fire Protection Assn.
International
Boston, Mass.

A good point. Our emphasis, of course, was on tangible losses.—ED.

MEETINGS

Chemical Buyers' Group—National Assn. of Purchasing Agents, Eastern meeting, Hotel Commodore, New York, Jan. 29.

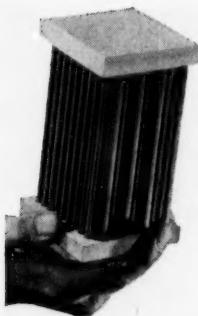
Industrial Security Institute, and Kanawha Valley Industrial Emergency Planning Council, first seminar on industrial mutual aid organization, Charleston, W. Va., Jan. 30-31.

American Society for Testing Materials, annual meeting, Benjamin Franklin Hotel, Philadelphia, Feb. 4-8.

Society of the Plastics Industry, Inc., 12th Reinforced Plastics Division conference, Edgewater Beach Hotel, Chicago, Feb. 11-13; Western section meeting, Ambassador Hotel, Los Angeles, Feb. 18-19.

American Pharmaceutical Manufacturers' Association, Central section meeting, Edgewater Beach Hotel, Chicago, Feb. 11-13; Western section meeting, Ambassador Hotel, Los Angeles, Feb. 18-19.

Technical Association of the Pulp and Paper Industry, 42nd annual meeting, Hotel Commodore, New York, Feb. 18-21.



An important message to the man who thinks his air pollution problem is too difficult—or too expensive—to correct

Too often an air pollution problem exists today for one reason only: The company concerned does not yet know there is now at hand an efficient, effective method of correcting it—often at an actual saving through waste heat recovery.

The method is catalytic oxidation, and the firm that makes this development possible is Oxy-Catalyst, Inc.

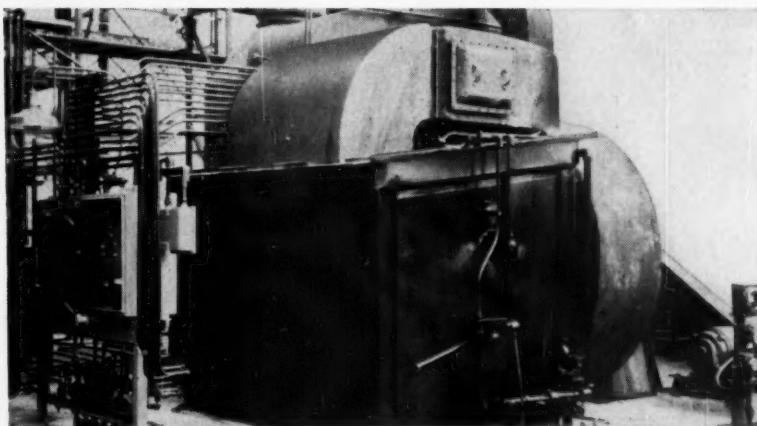
Catalytic oxidation works by "burning" harmful and irritating combustible contaminants in an exhaust stream at temperatures far below their normal ignition points. It provides close to 100% cleanup of foul-smelling fumes and odors. It reduces fire hazards and maintenance problems by eliminating troublesome condensates in oven and furnace exhausts.

Thus Oxy-Catalyst installations can not only control air pollution. They can also be used to release the latent heat energy in waste and process gases. And they can sometimes do both at once.

A More Efficient Catalyst

The key to successful catalytic oxidation is, of course, the catalyst itself. Features which make the OxyCat unique are:

- *The combination of platinum and alumina, chosen from hundreds of elements and compounds as the most active and long lasting catalytic agent*
- *The carrier, a high-grade porcelain selected for its strength, chemical inertness, and resistance to high temperatures*



OxyCat installation on Standard Oil Company of California's phthalic anhydride unit at Richmond, Calif.

- *The patented method of applying the catalyst to the carrier*
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The result of this combination of features is a catalytic unit with exceptionally long life at high efficiency. Oxycats are strongly resistant to thermal shock—to contaminating agents and clogging. There's no problem of frequent cleaning or reprocessing. Oxy-Catalyst installations are still functioning at high initial efficiency after over 20,000 hours without maintenance or servicing.

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Oxy-Catalyst installations are now working effectively in a wide range of industries

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Oxy-Catalyst installations are carefully engineered to your individual requirements, and our engineers, working with yours, can install Oxycats effectively in any existing plant. So, if air pollution is a problem in your operation—if irritating fumes and odors are costing you neighborhood good will—you should know that Oxy-Catalyst offers a practical, realistic answer to your problem.

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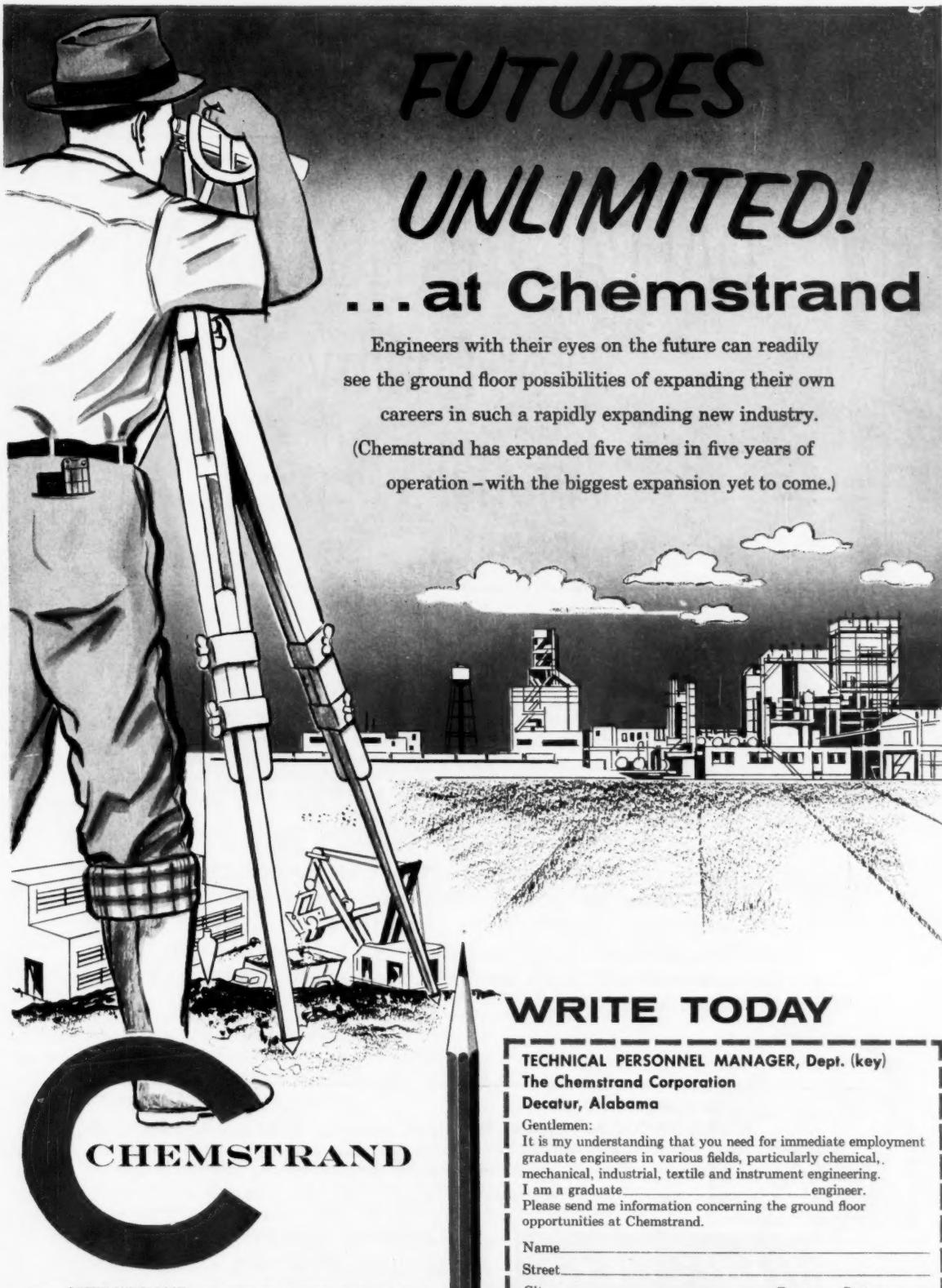
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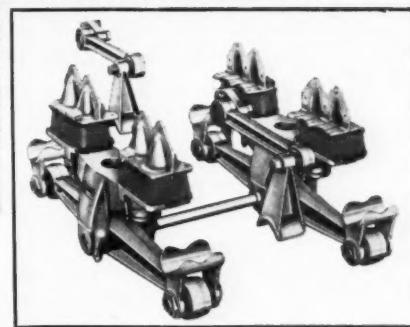
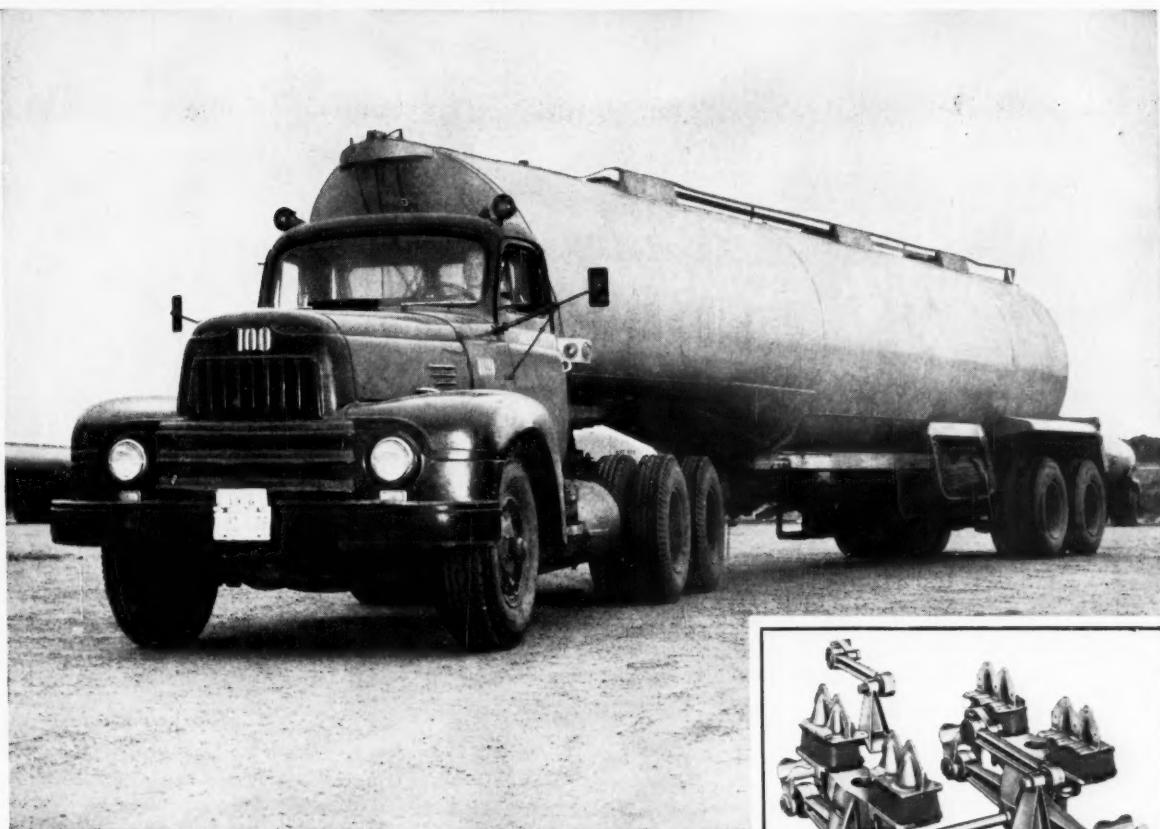
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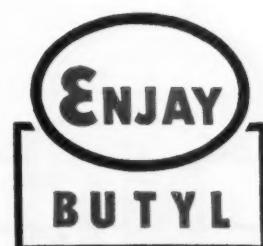
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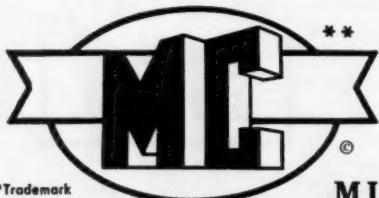
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	No. 1 Calcined Magnesite	No. 5 Calcined Magnesite	No. 15 Calcined Magnesite	No. 30C Light Calcined Magnesia	No. 40 Extra Lt. Calcined Magnesia	Basic Magnesium Carbonate	(NF Grade) Magnesium Hydroxide	(Tech. Grade) Magnesium Hydroxide
Bulk density, weight per cubic foot	60 lb.	28 lb.	24 lb.	8½ lb.	5 lb.	5.5 lb.	15 to 25 lb.	app. 20 lb.
Ignition loss:	0.5%	1.5%	2.5%	1.9%	3.0%	56.5%		31.4%
Chloride (as Cl):	0.08	0.1	0.2	0.25	0.25	0.1		
Analysis, ignited basis:							PASSES N. F. IX SPECIFICATIONS	
SiO ₂	0.3	0.3	0.3	0.3	0.3	— 0.15	Z	
Fe ₂ O ₃	0.2	0.2	0.2	0.2	0.2	— 0.08	O	
Al ₂ O ₃	0.2	0.2	0.2	0.2	0.2	— 0.08	I	0.20
CaO	1.0	1.0	1.0	1.0	1.0	— 0.7	N	0.15
Mn				0.01	0.01	— 0.00	I	0.7
Free Moisture						1.5	T	2.0
Screen test: Through 200 mesh		95%		99.9%	99.9%	99.99%	99.0%	99.0%
Screen test: Through 325 mesh			99.5%	99.5%	99.5%	99.5%		



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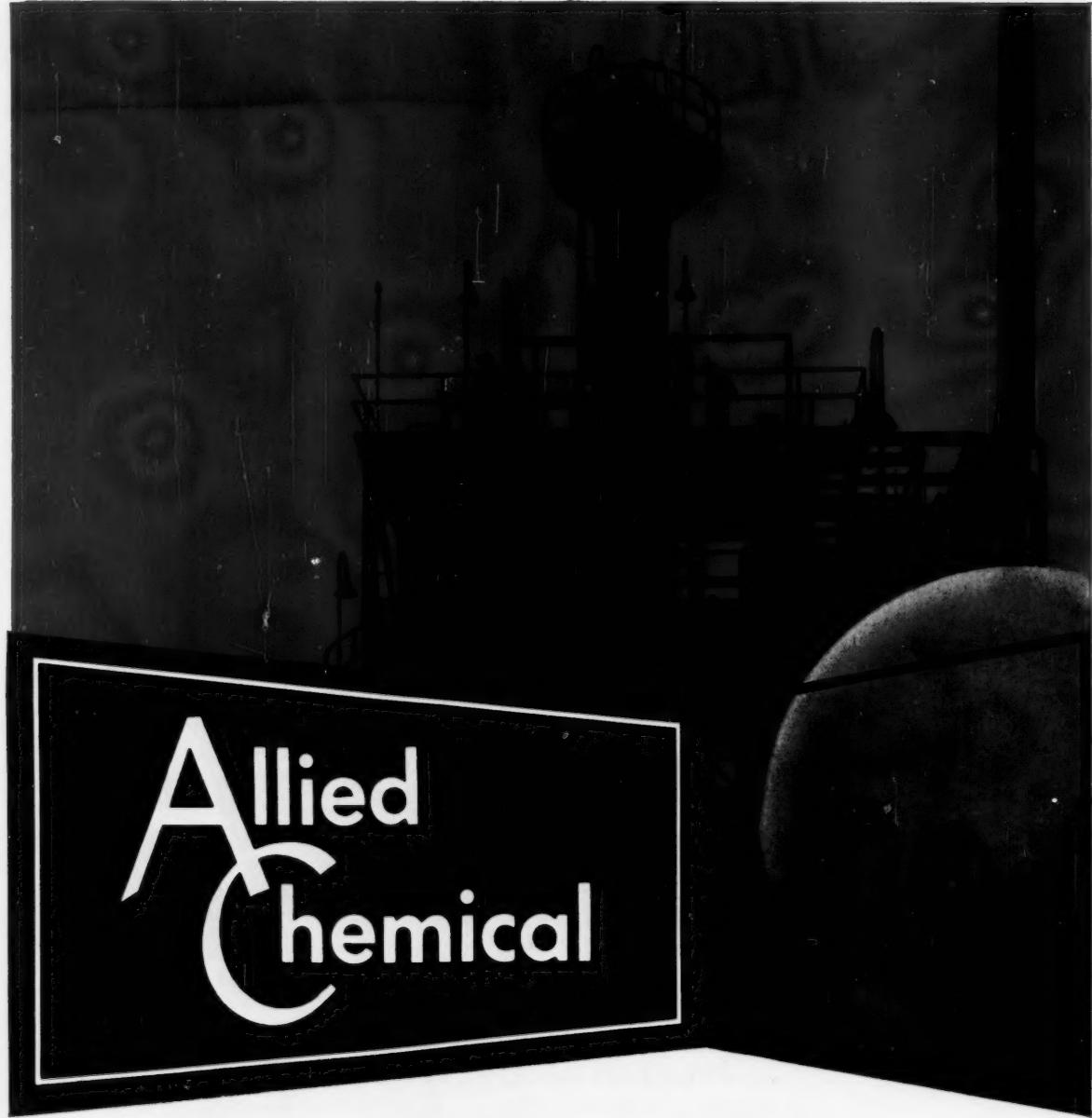
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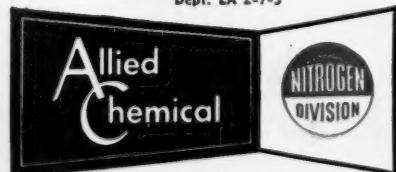
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Business Newsletter

CHEMICAL WEEK
January 26, 1957

A record high in cash dividend payments was chalked up by chemical companies last year.

Dividend payments of publicly-held firms totaled \$855.4 million in '56, a 2.75% increase over '55. But while it set a record, '56 didn't quite live up to early predictions that payments might touch \$900 million. The payout in December, although second highest of any month, was about 24% below December, '55—a drop that the U.S. Dept. of Commerce lays to a cutback in year-end "extra" dividends.

Compared to industry as a whole, chemical payments were low. Total corporation payments were up about 8% over the previous year's. In the Commerce tabulations of manufacturing firms, makers of non-ferrous metal products, electrical machinery, oil products, and iron and steel products all showed a greater gain over '55 than did chemical firms.

As expected, Interhandel says it will move to block the sale of stock in General Aniline and Film Corp. held by the Office of Alien Property (CW, Jan. 12, p. 20). The attorney for the Swiss holding company declares it "will oppose the sale of this Swiss property in every appropriate tribunal."

Main points of Interhandel's argument: federal law prohibits changes in the status of property seized by the government while litigation is pending. Interhandel claims that since it plans to present arguments to the U.S. Court of Appeals in February for a reinstatement of its case asking return of the stock, any sale at the present time is illegal; the Justice Dept. retorts that no litigation is now pending—and thus, the stock can be sold.

In line with its stand, Interhandel filed a request last week with Securities & Exchange Commission; it wants SEC to demand more information on GAF's Film registration.

There's new progress in eradicating the Mediterranean fruit fly. The U.S. Dept. of Agriculture has cancelled restrictions on interstate shipment of fruit from two more Florida counties where the Medfly had been found. Only four of the seven counties originally quarantined are still under such regulation.

Petroleum Chemicals, Inc., has added a 30,000-tons/year butyl rubber plant to its plans for new construction at Lake Charles, La. PCI

Business Newsletter

(Continued)

has already revealed its plans for a 200 million lbs./year ethylene plant, now says it plans to invest over \$17 million in a facility to make this synthetic rubber.

News of the plant has been expected for some time, since PCI had acquired a license from Standard Oil of N.J. several years ago. Foster Wheeler Corp. will build the unit (which will be designed to allow a 50% boost in capacity), figures to have it onstream by January, 1959. It's to be located adjacent to PCI's other petrochemical enterprises.

Royalite Oil Co. Ltd. is the first Canadian oil firm to reveal plans for development of the oil sands in the Athabasca River region of Alberta (*CW, Jan. 19, p. 23*). Royalite will spend \$50 million for a crude-oil processing plant, says projects in petrochemicals and rare metals will have to wait until crude-oil production is under way.

The Treasury Dept. is making a fresh start at revising its Bulletin F.

Bulletin F tells taxpayers what the Treasury Dept. believes to be the useful life of process equipment—which affects the amount of depreciation that can be allowed in a year. The bulletin has for years been under fire from business on two scores: (1) it does not list many items in common use; (2) it recommends an “unrealistically” long life for many items it does list.

Now, Treasury plans to set up a special committee to speed up modernization of the bulletin. Representatives of Treasury and the Internal Revenue Service will participate, and private citizens may also be asked to serve. Users of the bulletin will be asked to submit suggestions for the new version. Target: revised listing by the end of this year.

FDA has decided to ban nonprescription sale of hydrocortisone ointments and creams.

Early last year, FDA seemed ready to o.k. over-the-counter sales of the hydrocortisone and hydrocortisone acetate products, but by the time a hearing on the subject was launched last May, the attitude had plainly changed (*CW, April 14, '56, p. 48*). FDA's present position: available evidence fails to prove that the drugs are safe to use without medical supervision.

News that S. C. Johnson & Sons is making a synthetically based polish, Klear, is now followed by information that it is producing the synthetic polymer for the polish. Limited production of Klear indicates that manufacture of the polymer is still in the pilot-plant stage.



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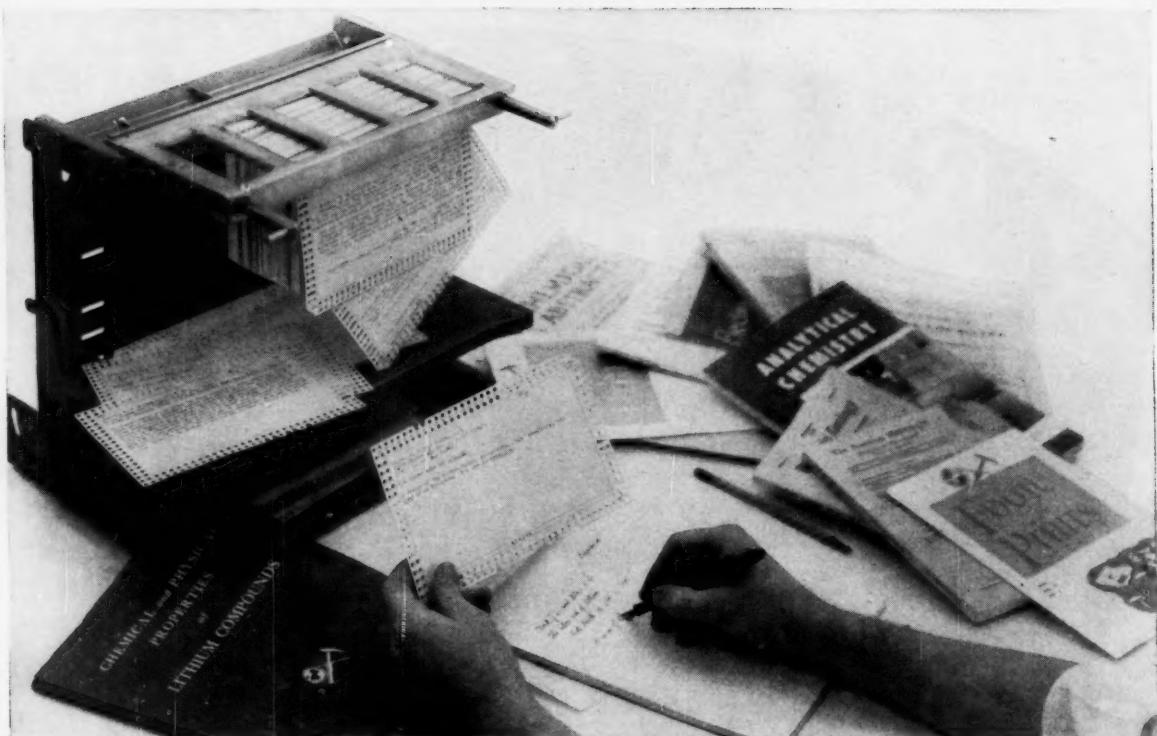
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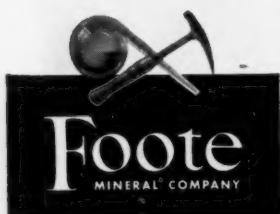
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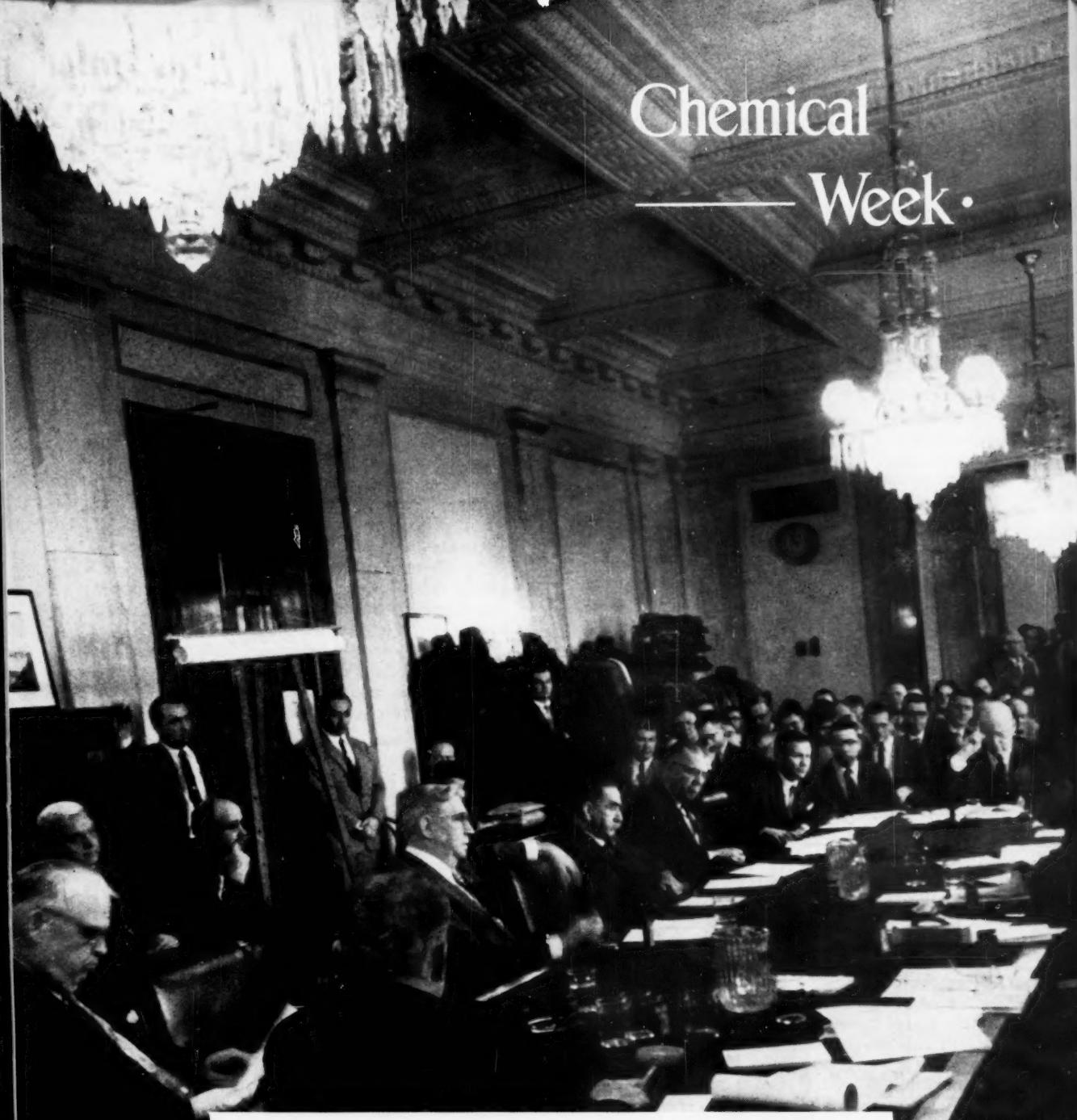
Write for *Chemical and Physical Properties of Lithium Compounds* and a taste of what Foote's store of lithium information has to offer you. This Data Bulletin is available on request to the Technical Literature Department, Foote Mineral Company, 420 Eighteen West Chelten Building, Philadelphia 44, Pa.



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Chemical Week

Chemical Stake in Congress

Hearings like the one above are getting to be routine as Congress begins to tackle its legislative calendar. From these hearings will come recommendations for legislation that will have lasting effects on the chemical process industries when, and if, they're enacted into law. The likely yardstick that chemical management will find most useful for evaluating what the new Congress will do is this:

More money for existing programs will be okayed; new pro-

Here's a rundown on bills important to chemical processors that will be studied by Congress this year.

Food and Cosmetic Additives—

No solution is imminent to bridge the rift between Food and Drug Administration and chemical-food industries over the right to appeal adverse FDA rulings under the proposed mandatory pre-testing (by additive makers) Food Additives Bill. But other disputed issues (Grandfather Clause, Functional Use Test) are nearer settlement. Outlook: possibly a new round of hearings but no action on a food bill. Action on cosmetic additives will also be deferred.

Barbiturates, Amphetamines, Narcotics—

Another fight is in prospect over the bill allowing FDA to inspect retail druggists' prescription files—with pharmacists opposing FDA and drug manufacturers on the issue. It's likely that Congress will vote the Karsten Bill giving Treasury's Narcotics Bureau strict licensing and quota-setting power over makers of synthetic narcotics.

Alcohol Taxes—

Modernization through recodification of Alcohol Tax Rules—worked out last year—is ticketed for passage this session.

Agricultural Research—

President Eisenhower's Citizens Commission will complete its nine-month study and make recommendations to Congress June 1 on prospects for boosting industrial use of surplus farm crops. Its findings should figure heavily in farm legislation debates next year. But, the commission will get in some quick licks this session, urging heavier funds for government agricultural research.

Statistics—

The Administration will pump hard for funds to expand Business and Defense Services Administration market surveys for chemicals, other products.

Scientist Shortage—

Look for new moves to boost pay of government researchers, curb pirating by private business. For the longer range, Congress will consider approving regular annual surveys of business and government research and development spending and manpower needs, may set up a permanent House-Senate committee to keep tabs on technical manpower problems. The White House may take a bigger hand.

Water Resources—

The Administration may ask Congress to set up

grams requiring financial outlay will be few and far between.

Still, there's a long way to go before final figures are set. Even now, indications point to a fight over higher government spending. Though the big battle will concern the military budget, it's possible that some of the items in the table above will be in for cuts.

It's easier to tick off the issues that

won't come up for serious consideration this year than those that will. Tax cuts, for one, are far more likely to come in '58. Next year, too, will see another battle over whether to renew the Reciprocal Trade Agreements Act.

Elsewhere, 1957 should be a year for consolidating the legislative gains of '56. FDA, for example, which last

a Federal Water Policy Commission under a White House "czar" to coordinate federal and state water use and development programs.

Rubber Plant Disposal—

Look for approval of a new round of bids to sell the Louisville alcohol butadiene plant—this time for conversion to general chemical manufacture. But, there may be a fight over the Pentagon's plans to shut down Navy paint plants.

Tariffs—

There's a 50-50 chance that Congress will okay U. S. membership in the Organization for Trade Cooperation (OTC) to administer the General Agreement on Tariffs and Trade (GATT). Protectionists, opposed to OTC, will be plunking hard for toughening the Federal Anti-Dumping Act, too.

Atomic Energy—

Democrats will renew their fight for a \$400-million federal power reactor construction program. The Administration will counter with proposals for more federal funds for reactors built by private industry. But, there's bipartisan backing for \$500 million in federal liability insurance for nuclear projects—over and above the \$65 million per project that private insurers are willing to put up.

Budget Recommendations—

	Current fiscal year (million dollars)	Next year (million dollars)
Atomic Energy Commission		
Reactor development	281.7	349.2
Civilian power reactors	59.6	95.0
Federal Trade Commission	5.5	6.2
Deceptive practices	1.1	1.1
Antimonopoly activities	2.5	2.7
Securities & Exchange Commission	5.7	7.1
TVA fertilizer, munitions	19.7	19.6
Agricultural research	94.4	102.5
National Bureau of Standards	7.7	11.5
Food and Drug Administration	6.7	9.0
Bureau of Mines	28.3	31.6
Saline water research	0.5	1.1
Public Health Service		
National Institutes of Health	182.8	189.9
Air pollution activities	2.7	4.1
Water supply, pollution activities	4.2	6.6
Justice Dept., Antitrust Div.	3.5	3.8
National Science Foundation		
Research and development	43.4	42.8

year had its funds restored to pre-1952 levels, is now asking a further one-third budget boost for use in enforcement.

All in all, though some controversial matters remain from last year, headline-provoking issues of chemical impact will be few; except in rare instances, debate is unlikely to flower into showdown battles.



NEW SIGN GOES UP, but the change may be premature.

What Now for Texas City?

Smith-Douglass's plan for reorganizing the bankrupt Texas City Chemical Co. may be facing new opposition—this time from the Internal Revenue Service.

S-D's plan (*CW*, Oct. 20, '56, p. 23), which successfully withstood a legal test in U.S. District Court last December, now may fall prey to a section of the 1954 Internal Revenue Code. The section involves the tax status of loss carryovers at a time one company acquires the assets of another. S-D, under its plan, had hoped to claim a tax loss of over \$3 million.

But IRS has yet to approve this claim, saying that no precedent has ever been set in its rulings which permits such a carryover in a reorganization scheme such as proposed for TCC—thus, a precedent-setting ruling is necessary. If the department doesn't come through with a favorable decision by Feb. 1, say S-D officials, it's "extremely unlikely" the company will go ahead.

If it drops the present reorganization plan, S-D will lose the substantial investment that it has already made in reopening the plant. Too, creditors of Texas City, who were to be paid about 33¢ on the dollar, won't be reimbursed. Only interested party to get anything—and that most likely from a liquidation sale—would be the First National Bank of Dallas, which presently holds the plant mortgage.

Meanwhile S-D will push hard for

approval of its plan, may even appeal an unfavorable IRS decision. It was the only company that made a firm offer for Texas City when the plant was up for offers—and it wants the chance to turn TCC into a profitable unit. Moreover, it already has its engineers and specialists getting the plant into operation, as agent for the bankruptcy trustee.

Until now, S-D's plans to take over the company have come along without meeting any unexpected opposition. What seemed to be one of the final hurdles was cleared last week when the deadline for objections from creditors and stockholders was passed. But the government's reluctance to approve the tax-load carryover has thrown up a troublesome barrier that has set back S-D's plan almost to where it started negotiations last year.

If the treasury department doesn't come through and S-D backs out, the plant could still be sold. It could be put up for a liquidation sale, in which case S-D could still buy, if the price—minus the tax deductible loss—were still attractive.

The IRS decision is expected sometime next week. Smith-Douglass and Texas City Chemical creditors are hopeful that the present plan will go through. But other companies, who had all but conceded the plant to Smith-Douglass, are now taking a fresh look at TCC reorganization.

Push for Profits

Ansul Chemical's President Robert Hood has defended his management methods and pointed to the company's profit picture for the past 10 years as proof of the methods' effectiveness.

At the annual stockholders meeting Hood said that since 1946, the company's sales have gone up 260%—from \$4,000,841 to \$14,442,511. And though the profit rise of 130%—from \$201,983 to \$464,986—hasn't been so spectacular, Hood expects this picture to improve as cost-cutting plans for 1957 materialize.

A well-known disciple of "buzz" sessions, "ideoramas" and the like, Hood responds to criticism of his management principles, published in *Fortune*, by re-emphasizing his support of frequent free-flowing round-table discussions and all-day management conferences.

"Changing your management methods," Hood reports, "is like growing a tree; you plant the seed, the tree grows, you graft on it, finally it bears fruit. The 1950-'56 period has been our training. We expect results from here on out."

"People," he adds, "are the real competitive difference between companies."

On plans for the company's chemical division: "We'll concentrate efforts on sulfur dioxide and methyl chloride, plus their end uses. Glycol ethers and hydroquinone are good potentials for methyl chloride."



ANSUL'S HOOD: In his view, people make the difference.

Patents: Index of Growth

Chemical process firms will soon get a look at a study that provides a new measure of their competitors' over-all company growth—as well as their research and development programs. The yardstick: corporate ownership of patents.

Data on the number of U.S. patents issued to some 600 domestic and foreign corporations, plus a host of other statistical material on the subject, is among information contained in a report ("Distribution of Patents Issued to Corporations"), soon to be issued by the Senate Judiciary Subcommittee on Patents, Trademarks, Copyrights.

Corporations are ranked in the report in order by the number of patents issued to them from 1939 to 1955, inclusive. Since this comprises a 17-year period, the study indicates the over-all number of unexpired patents corporations held at the end of '55.

High on the List: By any measure, chemical process industries hold a substantial patent position.

Though electric and electronic firms represent four of the five top companies, chemical process firms are high on the list of top patent-owning corporations, 14 of them placing among the top 25 during the period covered by the study. Four stand in the top 10. Top industrial firm listed is General Electric (10,757 patents), followed by American Telephone & Telegraph (8,539), Radio Corp. of America (7,894), and Westinghouse Electric Corp. (7,567). In fifth place is Du Pont (6,338); and following it are Esso Standard Oil, General Motors, Eastman Kodak, Bendix Aviation and American Cyanamid.

By and large, these same companies are among the leaders year in and year out. While 28 firms were listed in the top 15 for at least one of the years checked, nine were among the top 15 every year. Included: Du Pont, Esso Standard Oil, Eastman Kodak.

Here's the process industry rundown, listing all companies with 300 or more patents issued during the 17-year period, and their ranking in the over-all list:

Over-all Rank	Company	Patents Issued
5.	Du Pont	6,338
6.	Esso	4,899
8.	Eastman Kodak	3,784
10.	American Cyanamid	2,872
12.	Phillips Petroleum	2,424
13.	Shell Oil	2,374
16.	General Aniline & Film	1,919
17.	Dow	1,884
19.	Monsanto	1,747
20.	Socony-Mobil	1,697
21.	Universal Oil Products	1,665
22.	Union Carbide	1,645
23.	B. F. Goodrich	1,559
24.	U. S. Rubber	1,469
28.	Standard Oil (Indiana)	1,393
31.	Celanese	1,354
33.	Texas Co.	1,151
34.	Hercules Powder	1,107
37.	Imperial Chemical	1,030
41.	Allied Chemical	935
44.	American Viscose	871
49.	Rohm & Haas	788
50.	Olin Mathieson	779
51.	Gulf Oil	770
55.	Pittsburgh Plate Glass	743
58.	Firestone Tire & Rubber	705
59.	Merck	700
69.	Food Machinery	588
70.	Standard Oil (California)	578
71.	Union Oil (California)	573
73.	Sun Oil	536
75.	Libbey-Owens-Ford	523
80.	Ciba, Ltd.	480
81.	Air Reduction	478
84.	I. G. Farben	457
89.	Koppers	433
91.	Corning Glass	422
97.	Houdeille-Hershey	405
100.	Sinclair Oil	387
103.	Owens-Illinois	379
105.	Owens-Corning Fiberglas	370
106.	Pure Oil	368
107.	Hoffmann-La Roche	366
109.	Interchemical	363
114.	P. R. Mallory	354
118.	Upjohn	344
119.	Standard Oil (Ohio)	343
121.	Houdry Process	342
122.	Johns-Manville	341
123.	Parke, Davis	341
124.	Commercial Solvents	340
125.	3-M	338
126.	Armour	330
130.	General Tire & Rubber	308
133.	National Lead	301

Needed: Policy on ILO

Blame for industry criticism of U.S. participation in the International Labor Organization was dumped squarely in the lap of the U.S. government by a special Presidential committee in a report issued last week.

The committee, established last year by the Eisenhower Administration to study the ILO situation, recommends that U. S. participation continue on an even more vigorous scale than previously. But, says the report, the government has failed "to formulate a clear policy with respect to the organization. The result has been that employers have not known surely what this government's attitude toward the organization is.

The committee, in its report, recommends that U.S. policy towards ILO be clarified promptly, and that the State Dept. take the lead in setting policy towards ILO, with the help of the Commerce and Labor Depts.

Unrest and Withdrawal: Unrest of employer groups towards ILO has reached such proportions that some industrial representatives have threatened to withdraw their support. Chief points of criticism:

- The system of having government, industry, and labor representatives on committees has been a failure (particularly since the Soviet government pretends that its labor and industry delegates are not dominated by the government).
- ILO has interfered unduly in the internal affairs of nations.

Representation: The committee conceded that the Soviet government's domination of its delegation violates the spirit of the ILO constitution, and suggests that at the "proper time" the U.S. should press for rule changes, so as to allow the employer and the labor delegates to pass on the eligibility of similar delegates. No appeal of such rulings would be allowed. In the meantime, continues the report, credentials of such spurious delegates should continually be challenged.

Interference: In discussing internal interference, the committee points out that the ILO does not make international laws, as is contended by some groups. So-called legislation, says the report, has no binding effect on member states without their assent under their own constitutional processes.



FIGHTING THE FLAMES: Firemen combat unusual benzene blaze, as . . .

Winter Fires Take Toll

Winter weather took its toll last week at Midland, Mich. Benzene, solidified by the extreme cold, ignited during a thawing operation and destroyed tank trucks and buildings.

The chemical was bound for use in Dow's Midland production complex—though the company had not yet taken possession—and was being liquefied by the trucking company prior to delivery. There was one explosion before dawn on Wednesday, caused by fumes from the leaking liquid. A second fire occurred about noon when officials reportedly ordered holes shot in a nearby tank truck to relieve pressure within it and thus lessen fire hazards.

Fifty firemen from the city of Midland, and from Dow and Dow-Corning plants brought the flames under control but could not save the building or contents. Five workers were injured and loss was estimated at some \$300,000, plus 9,000 gallons of benzene. The buildings belong to Producers Transport, Inc., a trucking firm.

Elsewhere: Industrial and municipal natural gas customers of Panhandle Eastern Pipeline Co. were asked to find other supply sources temporarily when a gas compressor station in Liberal, Kansas, exploded, killing three men and injuring 12 with an estimated loss of several million dollars. An important gas

collection facility for the company, it supplies industrial users in Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan.

Supplies to these users were cut off, as well as those to three distributors who gather supplies from several sources. Emergency supplies—about one third of the demand—will be provided by a Panhandle subsidiary, Trunkline Gas Co., from Tuscola, Ill.

New Insurance Angle

Chemical management, perplexed by the controversial problems of insuring commercial-scale atomic installations against catastrophic damage, will want to check details of a proposal that private insurers be aided by government subsidy. The idea was presented last week by the Atomic Industrial Forum in a new report that is being widely distributed to interested parties.

The forum's "Final Report on Financial Protection Against Atomic Hazards" differs significantly from earlier insurance proposals. The forum recommends a government indemnity which would cover government contractors as well as licensees, and that no limit be placed on the amount of the indemnity.

Introduced, but not passed by Congress last year because of ex-

traneous political issues, were bills that would have set up a \$500-million claim fund to cover damages that would not be compensated for by a \$65-million fund put together by a group of insurance companies.

EXPANSION

Zirconium compounds: National Lead Co. will add a new building to its zirconium production complex in Niagara Falls, N.Y. The new project, scheduled for completion by July 1, will house facilities for making zirconium oxide and silicate.

Fatty Acids, Rosin: Monsanto Chemical and Emery Industries Inc. will jointly build a \$4-million plant in Nitro, W. Va., to produce unsaturated fatty acids and tall oil rosin.

Zinc: Consolidated Mining and Smelting will install two 150-ton electric induction furnaces at its plant in Trail, British Columbia. The new units are part of an over-all \$1.6-million modernization program to be completed in 1½ years.

Pulp & Paper: Union Bag-Camp Paper Corp. is planning a 600-tons/day paper mill at New Bern, N.C. The new unit will cost \$50 million.

Last week Union's directors also approved plans to install a new paper machine along with equipment for a hardwood pulp mill at its Savannah, Ga., site. The new installations, costing "several million dollars," will boost production there by 300 tons/day.

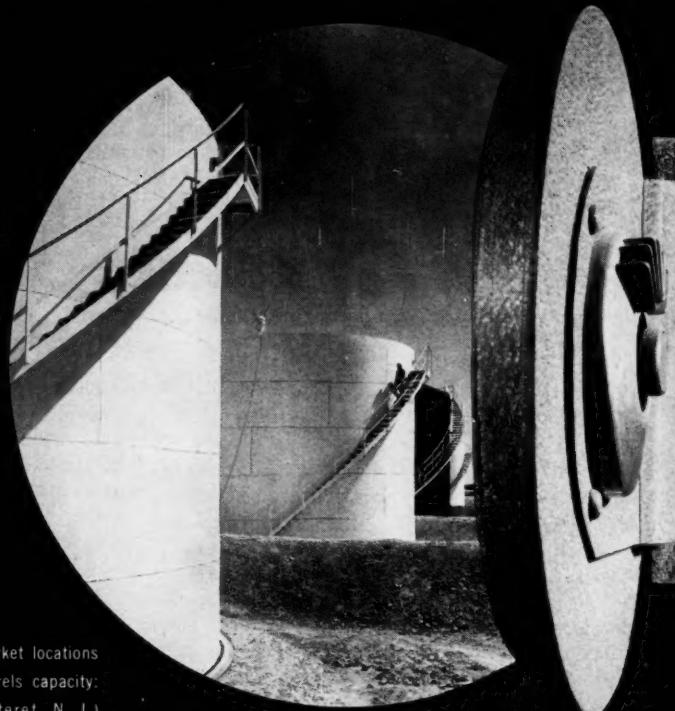
When all phases of the project are completed, in three to four years, total output will be 2,400 tons/day.

COMPANIES

Diamond Crystal Salt Co., St. Clair, Mich., has agreed to purchase the Jefferson Island Salt Co., Louisville, for about \$5.2 million. Final negotiations are to be completed this week.

Celanese Corp. has boosted the working capital of its affiliate, Columbia Cellulose Co., by buying \$10 million worth of Columbia's 5½% cumulative preferred shares. Columbia is wholly owned by Canadian Chemical & Cellulose which, in turn, is 80% owned by Celanese.

how to keep a **MULTI-MILLION-DOLLAR SECRET**



Six terminals at 5 key-market locations with over 12,000,000 barrels capacity:

PORT OF NEW YORK (Carteret, N. J.)

PORT OF NEW ORLEANS (Good Hope, La.)

CHICAGO, ILLINOIS (Bedford Park) • PORT

OF HOUSTON (Galena Park and Pasadena,

Texas) • CORPUS CHRISTI, TEXAS

General American blends and prepares anti-freeze according to secret formula!

Chances are the anti-freeze for your car came from General American. That's because General American is entrusted with the secret formula of one of the nation's largest manufacturers of anti-freeze. The manufacturer takes advantage of strategically-located General American terminals—and uses the services of skilled and trusted personnel. Anti-freeze is blended and prepared on the spot—

stored and distributed per instructions.

Your lease of General American Tank Storage Terminals can include modern barreling and drumming services. Leased facilities at six "key market" General American terminals give you the privacy, safety, service and flexibility of your own terminals — *without capital investment on your part.*



GENERAL AMERICAN TANK STORAGE TERMINALS

a division of **GENERAL AMERICAN TRANSPORTATION CORPORATION**

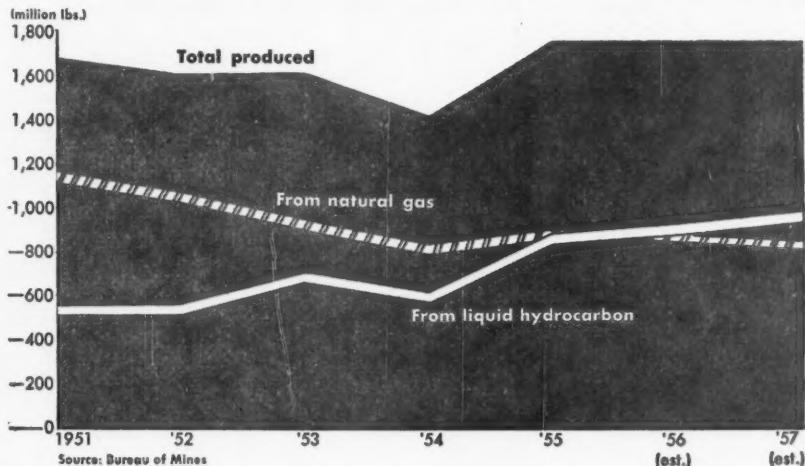
135 South LaSalle Street • Chicago 90, Illinois

Charting Business

CHEMICAL WEEK
January 26, 1957

CARBON BLACK PRODUCTION

This year liquid hydrocarbon will be the leading raw material



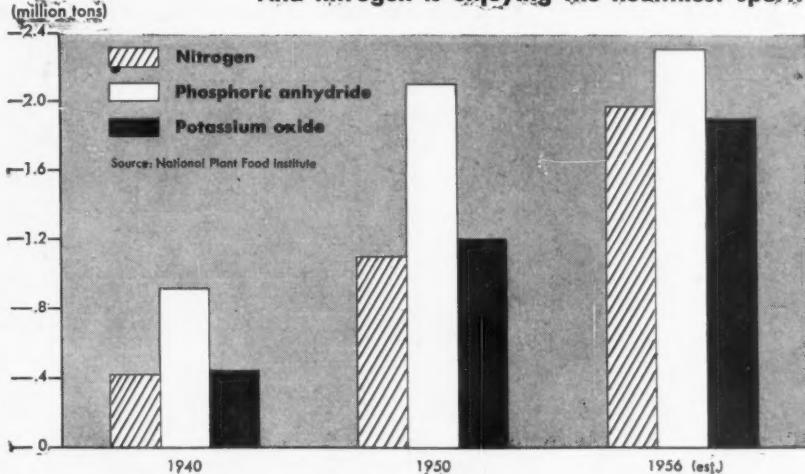
Source: Bureau of Mines

Consumption of oil-furnace carbon black has registered big gains over the past five years. This year, 67% of total production will be furnace black made from liquid hydrocarbon; in '51 it was only 27%. Reasons for the sharp decline of natural-gas black: rise of gas

prices (today, the average price of gas used for carbon-black production is ten times what it was in '41); the automobile industry's preference for oil-derived black. The auto industry today blots up over 90% of total domestic production of carbon black.

U. S. Consumption Of Plant Nutrients is Growing . . .

And nitrogen is enjoying the healthiest spurt.



Source: National Plant Food Institute

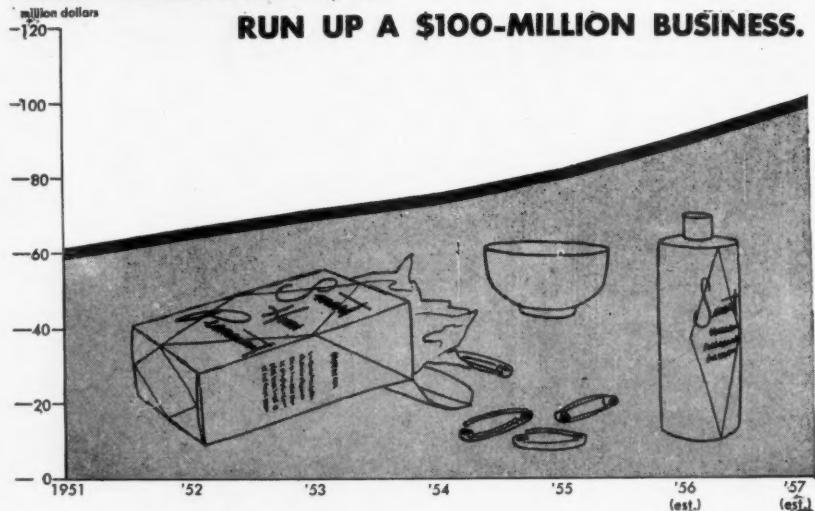
While total use of fertilizers has declined since 1953, consumption of primary nutrients has increased each year since 1940. This points up the trend toward higher nutrient content per ton of fertilizer—a trend that has paid dividends for nitrogenous fertilizers.

Production has leaped from 419,000 tons in '40 to 2 million tons in '56, a 376% jump (CW, Jan. 12, p. 64). The increased use of potash for fertilizer has been only slightly less spectacular: 435,000 tons (in terms of potassium oxide) in '40 to 1.9 million in '56.

Charting Business

(Continued)

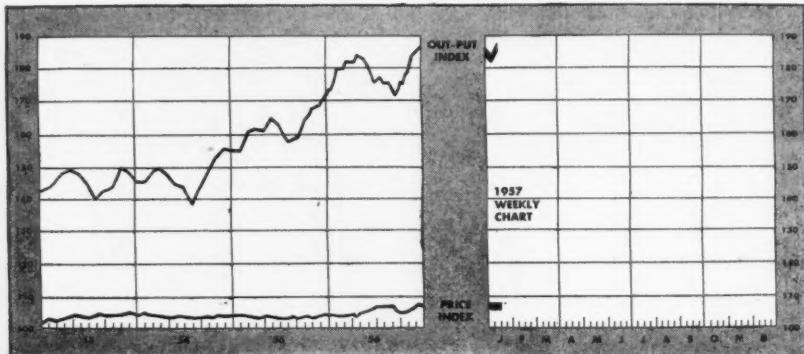
HOME PERMANENT KITS RUN UP A \$100-MILLION BUSINESS.



SALES of home permanent-wave kits are still climbing skyward. Sales this year should total \$100 million, and the market will be nowhere near saturation. Chemicals used in these kits this year should chalk up the following produc-

tion records: thioglycolic acid, 800,000 lbs.; ammonia solution, 1 million lbs.; perfuming agents, 16,000 lbs.; various emulsifiers, 175,000 lbs.; mineral oils, 225,000 lbs.; wetting agents, 45,000 lbs.; plastics, 15,000 lbs.

BUSINESS INDICATORS



WEEKLY

	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	187.1	186.5	177.5
Chemical Week Wholesale Price Index (1947=100) ..	108.3	106.9	105.5
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	422.2	429.9	463.8

MONTHLY INDICATORS—Trade Manufacturers' Inventories

(Million Dollars)	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All Manufacturing	28,808	28,294	27,343	51,292	50,815	45,669
Chemicals and allied products	2,106	2,081	2,014	3,687	3,740	3,157
Petroleum and coal products	2,682	2,565	2,479	3,120	3,133	2,768

U.S.I. CHEMICAL NEWS

Jan. 4

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

1957

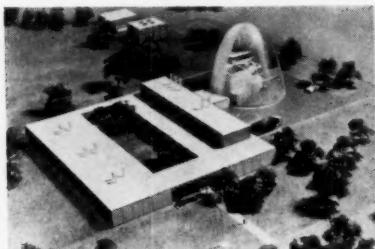
Nuclear Reactor Planned By U.S.I. and 9 Others For Industrial Research

A privately owned nuclear reactor for industrial research will be built and operated at Plainsboro, N. J. by a new company, Industrial Reactor Laboratories, Inc., formed by U.S.I. Division of National Distillers and 9 other companies.

U.S.I.'s participation in this new undertaking is one more step in its expanding research program. There are many possible avenues of research open. For example, radiation techniques provide new variations in the properties of polyethylene. The company is an important producer of polyethylene and plans to use the new reactor for the study of radiation techniques and effects on the resin.

Many chemical reactions may be energized or modified by the use of nuclear radiation.

MORE



Model of the Industrial Reactor Laboratories research reactor to be built by 10 participating companies, including U.S.I. The reactor is the dome-shaped structure while the building in the foreground will house individual laboratories of the participating companies.

Greenleaf to Handle Market Development of Zirconium and Titanium for U.S.I.



William C. Greenleaf has been named Manager of Metals Development for U.S.I. and will be responsible for market development and sales of zirconium and titanium sponge, to be produced from U.S.I.'s two new plants now being built in Ashtabula, Ohio.

A recognized authority in the field of zirconium and titanium, Mr. Greenleaf presented three papers during the 1955 Atomic Industrial Forum Zirconium Program, describing (1) melting of zirconium, (2) fabrication of zirconium, and (3) zirconium mill products and prices. He also conceived and developed processes now in general use for producing both wide-sheet and flat-bar titanium and zirconium by continuous strip-mill techniques.

Zirconium and Titanium Lick Roughest Corrosion Problems

Metals to be Available at Lower Cost in Future;
Provide Long-Lived Materials of Construction;
Complement Each Other on Corrosion Resistance

It is now practical to fabricate equipment which is *corrosion-resistant to almost every substance encountered in industry*, by using either zirconium or titanium metal. Alloys of either metal, or possibly both, may extend the range even further.

To date titanium has been used principally in aircraft construction, where its high strength-to-weight ratio offers great advantages. And zirconium has been developed primarily for atomic energy work as a strong and corrosion-resistant metal with desirable nuclear properties. The demand for titanium and zirconium created by these applications has greatly accelerated the production capacity and fabrication technology of these "new" materials of construction, making them available to the chemical industry in a short time and at a reasonable price.

Supply Increasing in 1957

Industrial applications of these metals have been hampered by two considerations: availability and price. Zirconium will shortly be produced at a rate sufficient to supply industrial needs, and titanium has been available to industry during the past two years. And it is expected that increased production of these metals during the next few years will result in significant price decreases.

MORE

Typical Corrosion Resistances* of Zirconium and Titanium

Corrosive Media	Metal Resistance	
	Zirconium	Titanium
Sulfuric Acid	excellent to good below 80%	good below 5%
Nitric Acid	excellent	excellent
Hydrochloric Acid	excellent	good below 10%
Phosphoric Acid	excellent to fair below 85%	poor
Chromic Acid	excellent	excellent to good
Aqua Regia	poor	excellent
Wet Chlorine Gas	poor	excellent
Chlorine Water	excellent	excellent
Sodium Hydroxide	good below 90%	good below 50%
Ferric Chloride	poor	excellent
Calcium Chloride	excellent	excellent
Cupric Chloride	poor	excellent
Sodium Chloride	excellent	excellent
Ammonium Chloride	excellent	excellent
Aluminum Chloride	excellent	excellent to fair

*Above data do not cover all conditions because of space limitations. Literature references may be obtained by writing the Editor, U.S.I. Chemical News, 99 Park Ave., N. Y. 16, N. Y.

Jan. 4

★

1957

U.S.I. CHEMICAL NEWS

CONTINUED

Corrosion

Twelve to thirteen thousand tons of titanium were available in 1956 and present construction schedules indicate that the figure will rise substantially in 1957. U.S.I.'s new plant alone will add 5,000 tons to the annual production capacity by the end of the year. Zirconium will be on the market in quantity by mid-1957. When its new plant at Ashtabula, Ohio gets under way, U.S.I. will be able to supply 500,000 pounds or more per year to commercial users in addition to its Atomic Energy Commission commitments of 1,000,000 pounds per year.

New Metals Economical

Chemical process equipment can now be fabricated from titanium for a little over twice the price of stainless steel, and it is expected that in the future titanium equipment will be only 50-75% higher than stainless. Commercial grade zirconium equipment will probably be priced only 75-100% higher than stainless when volume production is reached.

Several other factors combine to make zirconium and titanium economical as corrosion-resistant materials of construction. For many of the more difficult-to-handle chemicals, especially chlorides and oxidizing acids, equipment fabricated from these metals can have extremely long service life. Product contamination can be virtually eliminated in chemical and food handling processes.

Corrosion resistances of zirconium and titanium to typical chemicals are presented in the chart on page 1.

Methionine Increases Protein Utilization Of Dried Fish Meal

Supplementation of commercial fish meal with DL-methionine, an essential sulfur-containing amino acid, raises significantly the net protein utilization of the meal, according to a report recently published in England.

During the drying process, the action of heat in the presence of moisture is said to impair the protein quality of fish meal. Methionine becomes the chief limiting amino acid, and increasing the methionine content of the fish meal through supplementation restores most of the protein value of the meal.

CONTINUED

Reactor

U.S.I. plans to look into new and more efficient processes for the production of a wide variety of chemicals through research at the proposed installation.

Participation in the project will also enable U.S.I. to make further studies on materials for nuclear reactors. The company is a major producer of metallic sodium, used as a heat transfer medium for certain types of reactors.

And zirconium will be produced by U.S.I. in the near future under a contract with the Atomic Energy Commission. Zirconium is a key structural material for atomic reactors and a raw material for the production of reactor fuel elements. The company is vitally interested in developing still other materials and chemicals used in the generation of atomic power.

Faye Named Manager of Sodium Product Sales



Martin Faye has been named Manager of Sodium Product Sales for U.S.I. and will be responsible for coordinating sales and sales promotional activities for metallic sodium, "U.S.I. Isosebacic" acid and related products.

Mr. Faye joined the U.S.I.-National Distillers organization in 1952 in the Market Research and Development Department, where he was responsible for commercial development of "U.S.I. Isosebacic" acid. "U.S.I. Isosebacic" is the registered trade mark for a mixture of 10-carbon dibasic acids produced synthetically for the first time by a U.S.I.-developed process. A 10,000,000 pound-per-year plant to produce this material is under construction at U.S.I.'s Tuscola, Illinois plant site, and is expected to be in operation by mid-1957.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing the Editor, U.S.I. Chemical News.

Polyethylene "pillows" to retard evaporation of liquids in open tanks and vessels are now being produced. They are air-filled, $\frac{3}{8}$ " by $\frac{1}{4}$ " by $\frac{1}{2}$ " in size. A $\frac{1}{2}$ " layer is claimed adequate for solutions at any concentration. **No. 1190**

Monomethylol dimethyl hydantoin, now produced commercially, is offered as an almost odorless donor of formaldehyde and for reaction as a substituted hydantoin. Contains 19% combined formaldehyde capable of liberation. **No. 1191**

New alkaline scale and oxide remover for iron and steel is said to act electrolytically for rapid removal without chemical attack. Recommended for plating lines and automatic equipment involving alkaline solutions. **No. 1192**

A zirconium-copper alloy now available is reported to combine high electrical conductivity with good strength retention at elevated temperatures. Suggested for electrical motor commutators serving above 500°F where strength is needed. Conductivity is 95.8% of copper. **No. 1193**

Fire protection for chemicals is discussed in a new 152-page book which can be purchased by those interested in the subject. Chemical hazards are analyzed, and methods of fire prevention and fire fighting are covered. **No. 1194**

A new cellulose derivative dissolves readily in cold water and is suggested for use as a thickener, emulsifier, adhesive and binder. The material is an ethyl-hydroxyethyl cellulose. Solutions are claimed to resist mold. **No. 1195**

A dye for photographic emulsions has just been synthesized which extends their sensitivity far into the infrared. Known as thiadexacarbocyanine, the dye has its absorption maximum at 1140 millimicrons. **No. 1196**

Titanium wire cloth is now on the market in sizes from 60 mesh to coarser grades. It is reported to be particularly suitable for filtering or screening highly corrosive materials. **No. 1197**

A new material for standardizing acids directly in one step is now available to laboratory workers. It is triis (hydroxymethyl)-amino-methane, reported to eliminate the usual acid vs. base, base vs. phthalate procedure. **No. 1198**

Glycerine, its commercial grades, specifications, test methods, shipping and storage requirements, is described in a 19-page booklet just issued. A 17-page booklet on properties and uses of glycerine is also available. **No. 1199**

PRODUCTS OF U.S.I.

INORGANIC CHEMICALS:

Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.
Chlorine: liquid, in tank cars.
Caustic Soda: 50% liquid, in tank cars.
Sodium Peroxide: dust-free granules, in drums.
Sulfuric Acid: all strengths, 60° Béauté to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank wagons.
Ammonia: Anhydrous, commercial and refrigeration. Tank cars or tank wagons. Also Nitrogen Fertilizer Solutions.

OTHER PRODUCTS:

Alcohols: Ethyl (pure and all denatured formulas), Normal Butyl, Amyl, Fusel Oil; Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

PETROTHENE® Polyethylene Resins.

Esters, Ethers and Ketones: Normal Butyl Acetate, Dibutyl Phthalate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone.

Intermediates and Fine Chemicals: Acetoacetylides, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate solution, Urethan USP (Ethyl Carbamate).

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curby B-G® 80, Special Liquid Curby®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B₁₂ and Antibiotic Feed Supplements, Vacotone® 40, Vitamin A, D₃ and K₃ Products, Antioxidant (BHT) Products.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

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INDUSTRIAL CHEMICALS CO.
 Division of National Distillers Products Corporation
 99 Park Avenue, New York 16, N. Y.

ADMINISTRATION



SHUTTERED PLANT: Norfolk unit manager views unit whose closure is at issue as industry is...

Preparing Its Tariff Evidence

This week, as the 85th Congress is scheduling hearings on proposed legislation that may alter the country's trade and tariff framework (see p. 21), Synthetic Organic Chemical Manufacturers Assn. task forces are hard at work conducting investigations that may well give Congressional and administrative groups concerned with tariff laws suggestions of far-reaching significance.

A likely starting point for one of these work units: the record of the Tariff Commission hearing held early last year on Sumner Chemical Co.'s bid for relief from foreign imports of para-aminosalicylic acid and its salts (*CW, Feb. 11, '56, p. 38*).

This group, a SOCMA spokesman indicates, is interested in compiling evidence to show the degree to which sensitive industries involved in questions of tariff levels have need for accurate and comprehensive import and domestic production statistics. PAS manufacturers, and makers of

many other organic chemicals, would fall into this category.

Such studies may be important now that Congress is already turning its attention toward tariff law revisions. With the legislative session hardly underway, seven bills have been introduced in the House of Representatives —two aimed at sweeping protectionist revisions of present trade policies. The first of these, introduced by Rep. Henderson Lanham (D., Ga.), provides for general import quotas tied to the cost of foreign production and the percentage of the domestic market enjoyed by the article involved.

The second, introduced by Rep. H. R. Gross (R., Iowa), seeks the addition of import controls to the provisions of the Export Control Act of 1949, as well as changes in the present export controls.

In addition to information such as that which attempts to show the important role played by reliable statistics in tariff considerations, the

SOCMA group may well make available detailed case histories of import injury to specific products. Two that might be included: PAS itself and the caffeine-theobromine product complex.

A Plant Closes: Assertedly inadequate tariff protection and a technological change in the chocolate industry forced Monsanto Chemical Co. to close its Norfolk, Va., theobromine plant (*picture, above*), which had been in operation since 1925.

The plant was producing crude theobromine and cocoa butter from cocoa residues—most of which came from abroad. The crude theobromine was in turn sent to the company's St. Louis plant for refining into purer grades of theobromine and caffeine. When operating at full capacity, the Norfolk plant employed some 180 men and women, had an annual payroll of approximately \$500,000.

Monsanto officials hasten to point out that certainly half of the blame

ADMINISTRATION

for the plant's shutdown must go to a technological change in the chocolate industry that resulted in the increased use of cocoa expeller cake—the residue that previously had no market except as a raw material for making crude theobromine and cocoa butter. Consequently, an increase in the cost of the expeller cake resulted.

Spokesmen, however, pointing out that tariffs on caffeine last year were reduced for a second time, say the combination of lack of adequate tariff protection and the increased cost of raw materials was too much for the company to withstand.

In a survey of the current picture, Monsanto says present domestic pricing of caffeine is under "strong downward pressure from imports," all of which appear to be synthetic production (see table).

A Monsanto spokesman points out that U.S. Tariff Commission reports indicate caffeine imports started arriving in this country in large volume approximately 18 months ago, and have been increasing steadily ever since, with U.S. caffeine consumption showing no corresponding increase.

"The implications are obvious," Monsanto reports. "Domestic caffeine is priced at approximately \$3/lb. If you'll check brokers, you'll find that imported caffeine is being freely offered at \$2.75/lb, and less."

PAS Problems: For PAS acid and its salts, and Sumner Chemical Co., the story has been somewhat similar. Steadily increasing imports at lower and lower unit values have been forcing down the price of the U.S. material (table).

PAS is used almost exclusively for the treatment of tuberculosis—and thus is used, for the most part, in government-supported institutions. These institutions account for 80% of all U.S. PAS purchases. And, because of various state, federal and local government policies, they must buy at lowest bid. This built-in protection for free enterprise actually works against domestic producers, since imported PAS is offered at a lower market price than the domestic material can meet.

"For example," says Lewis Williams, Sumner's New York sales manager, "imported PAS comes into this country at around \$1.17/lb. Duty would raise the price to \$1.88, and by the time

the material reaches the customer, it sells for about \$2.10. Sumner's published, freely offered price is \$2.70/- lb."

The acuteness of the problem, Williams indicates, is shown by the fact that 60% of all TB patients under medical care in this country are treated with imported PAS—mostly from West Germany, Italy and Switzerland. By comparison, he reports that in 1951, less than 1% of the PAS used in this country was imported. The duty then: \$2.60/lb.; today's duty: 71¢.

"The low price of PAS acid and certain of its salts in the U.S. today," Williams holds, "discourages use by TB institutions of somewhat more expensive, but more desirable physical forms of PAS."

Unlike Monsanto, Sumner cannot afford to close its plant; PAS produc-

tion is the company's largest single activity.

What are the company's plans? As Williams puts it, "We are doing what the Tariff Commission advised when it refused relief; we are looking for additional products to manufacture in our PAS plant."

Future Relief: While certain chemical industry executives look to new legislation as a cure, others feel the best prospects for future relief lie not with new legislation but with better use of existing laws. They feel present machinery for relief—defense essentiality, anti-dumping and escape-clause legislation—has not been properly used.

But in order to make use of this machinery, they warn, manufacturers must form a united front to present all evidence showing industry-wide harm.

DO IMPORTS AFFECT U.S. CHEMICAL PRODUCTION?

Here's the record on para-aminosalicylic acid and its salts—

IMPORTED PAS DOMESTIC PRODUCTION

Year	Volume (1,000 lbs.)	Total Value (000 omitted)	Unit Value	Output Volume (1,000 lbs.)	Total Sales (000 omitted)	Unit Value
1951	11	\$38	\$3.45/lb.	580	\$1,987	\$4.63/lb.
'52	92	221	2.40	474	1,508	3.67
'53	201	313	1.55	475	1,115	3.10
'54	289	363	1.20	423	849	2.80
'55 (first 10 mos.)	344	471	1.30	395	694	2.62

And on caffeine, natural and synthetic—

IMPORTED CAFFEINE

DOMESTIC PRODUCTION

IMPORTED CAVIAR			DOMESTIC PRODUCTION				
Year	Volume (1,000 lbs.)	Total Value (000 omitted)	Unit Value	Output Volume (1,000 lbs.)	Quantity Sold (1,000 lbs.)	Total Sales (000 omitted)	Unit Value
1951	38	\$135	\$3.55/lb.	2,279	1,920	\$7,745	\$4.03
'53	292	618	2.12	1,554	1,580	4,913	3.11
'55	388	789	2.03	1,238	1,238	3,673	2.97

Sources: U. S. Tariff Commission, U. S. Dept. of Commerce.



FORMALDEHYDE...

by the drop in 1889 . . . by the tanker today!

The first production of Formaldehyde in 1889 by Mercklin and Lösekann was measured in a handful of kilograms and carefully doled out to laboratories and manufacturers. Today, Celanese alone regularly delivers millions of gallons of this workhorse chemical by tanker, barge, highway and rail.

And today's Formaldehyde . . . the Formaldehyde developed by progressive Celanese re-

search . . . is a specialized chemical produced in a variety of concentrations to meet specific process requirements, to help speed and improve the manufacture of thousands of products. Celanese, one of the world's largest producers of Formaldehyde, now supplies: Formalin (37%), Paraformaldehyde (flake-91%), Formcel Solution (Formaldehyde in specified alcohols) and Trioxane (anhydrous trimer).

Harnessing this workhorse chemical into these much needed specialized types, as well as distributing them in continuous commercial quantities, are part of a Celanese program to render better service to industry through more productive basic materials.

Celanese Corporation of America, Chemical Division, Dept. 652-A, 180 Madison Avenue, New York 16, N. Y.

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Acids	Functional Fluids
Alcohols	Gasoline Additives
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for improved products

Celanese
CHEMICALS

Agricultural, automotive,
aviation, building,
electrical, paper,
pharmaceutical, plastics,
surface coatings, textile.

ADMINISTRATION

HOW PENSION FUNDS ARE PILING UP

(Average assets per employee)

Year	All manufacturing industries	Chemicals & allied products
1951	\$435	\$660
'52	545	780
'53	637	920
'54	794	1,153

Sources: Securities & Exchange Commission, Business & Defense Services Administration

New Role for Pension Funds

Employee pension funds, as a corporate budget item, as an ingredient in personnel relations, as a source of new capital and as an increasingly important stockholder in U.S. business, are rapidly taking on a big new role in industry. Chemical companies alone are now paying some \$175 million/year into such funds.

If recent pension fund trends, as measured in studies by governmental and other agencies,* are continuing, assets of chemical and allied products industry pension funds now amount to about \$1.12 billion, or an average of \$1,350 for each of the industry's approximately 834,000 employees.

'Frozen' Job Holders: The rapid growth of these funds (*table, above*) poses specific new problems for management and labor, as well as for the national economy in general. Among these problems, as summarized by the National Planning Assn. in a just-published study:

- **Decreasing mobility**—less willingness to change jobs—on the part of executives and white-collar employees as their stake in a given company's pension fund increases. Although one of industry's major reasons for setting up pension funds in the first place was to give key employees more incentive to "stay put," NPA

*"Survey of Corporate Pension Funds, 1951-'54," Securities & Exchange Commission; "Welfare and Pension Plans Investigation," Senate Committee on Labor and Public Welfare, '56; "Corporate Pension Funds," Business & Defense Services Administration, Dec., '56; "Private Pension Plans," National Planning Assn., Dec., '56; and biennial surveys on fringe benefits by the Chamber of Commerce of the United States.

holds that this "tendency to freeze people into their existing occupations" has adverse effects on all parties. It suggests that a remedy might be to switch from "nonvesting" pension plans to a system in which the employee, regardless of whether or not he changed jobs before retiring, would still have the same equity interest in whatever annuity had been generated

by the employer's contributions.

- **Increasing availability** of investment funds in all sections of the money market—including "risk capital" for industrial expansion. Consequently, pension fund trustees and administrators would have increasing authority in industrial management.

- **Employee relations significance** of private pension plans—both as to collective bargaining and as to labor-management relations generally.

Switch To Stocks: Up to 1950, pension funds in the chemical industries were invested largely in U.S. bonds and similar conservative holdings; but since then, there's been an increasing move toward "liberalism," i. e., investment in common stocks.

BDSA estimates that by 1954, 60% of assets in chemical company pension funds were in "noninsured" plans, which can use more liberal investment policies, in contrast to "insured" plans—those administered by insurance companies — whose investment practices are less limited by state laws and regulations.

Of those 1954 assets in noninsured chemical pension funds, 17.9% (\$98 million) was invested in common stock. But only \$2 million was invested in common stock of the funds'

INVESTMENT TREND: TOWARD CORPORATE SECURITIES

(Relative distribution of assets in noninsured private pension funds)

Type of asset	All manufacturing industries		Chemicals & allied products	
	1951	1954	1951	1954
U. S. government securities	37.0%	20.3%	46.5%	38.2%
Corporate bonds and debentures	39.9%	49.0%	23.8%	34.9%
Common and preferred stocks	15.9%	24.8%	15.5%	23.8%
Cash, mortgages, and other assets	8.2%	5.9%	14.2%	3.1%
	100%	100%	100%	100%

**Sodium
Polyphos**

(SODIUM HEXAMETAPHOSPHATE)
(SODIUM TETRAPHOSPHATE)

**Trisodium
Phosphate
Chlorinated**

**Tetrasodium
Pyro
Phosphate**

**Trisodium
Phosphate**

CRYSTALLINE
MONOHYDRATE

Sodium

**Sodium
Tripoly
Phosphate**

**BLOCKSON
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*Division of Olin Mathieson
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JOLIET, ILLINOIS



Phosphates

**Disodium
Phosphate**

ANHYDROUS
CRYSTALLINE

**Monosodium
Phosphate**

ANHYDROUS
MONOHYDRATE

**Sodium Acid
Pyro
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producers of:
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SODIUM FLUORIDE
SODIUM SILICOFLUORIDE
HYDROFLUORIC ACID
HYGRADE FERTILIZER
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ADMINISTRATION

parent firms. Overall, the common stock holdings of noninsured private pension funds in all[†] industries tripled in the three years from 1951 to '54, reaching a total of \$2.1 billion. It's only logical to suppose that a good chunk of that investment is in chemical stocks; and NPA says the switch toward common-stock holdings "undoubtedly" has continued since '54. The Senate's subcommittee on welfare and pension plans figures that "pension funds today usually carry from 25% to 35% of assets in common stock."

Concentration of Control: NPA notes testimony that relatively few large banks and insurance companies manage the bulk of the larger pension funds, and that accordingly "a steadily increasing control of the U.S. economy falls into a very few institutions."

These considerations, NPA states, raise questions over the possible need for self-policing by those banks and insurance companies or, alternatively, whether and to what extent governmental supervision may be needed.

NPA suggests use of pooled pension plans as a means of enabling small and medium-sized companies to jointly provide pensions with benefits comparable to those of large concerns' pension plans; it concludes that more active participation by labor in the management of private pension systems is both necessary and desirable—and probably inevitable. It holds that "neither workers nor employers are likely to obtain the maximum benefits of private pensions unless and until there is a comprehensive and integrated approach to wages, pensions and other forms of compensation."

For chemical management, there appear to be three factors tending to make pension funds particularly significant to this industry:

(1) Company contributions have been accounting for 98% of all money paid into noninsured chemical pension funds, compared to a 91% figure for all manufacturing.

(2) Because of their wide dependence on technology, companies in the chemical industry may have a greater stake in attracting and holding key employees than most other industries.

(3) Chemical companies, because of their growth nature, have recurring need for money to finance expansion—money that pension funds may well supply.

[†]Except those established by banks, insurance companies and railroads for their own employees.



GOUGER: How much decentralization in multi-plant personnel plan?

LABOR

Wage Drive Groundwork: Researchers for the Oil, Chemical & Atomic Workers (AFL-CIO) have completed a study of the chemical industry that may presage OCAW's long-range drive to boost chemical wages toward the level of petroleum industry pay scales. OCAW Research Director E. E. Phelps, while conceding that chemical earnings are higher than the all-manufacturing average, points out that average hourly earnings in the chemicals and allied products industry are (a) significantly lower than those in the steel, petroleum, coal and rubber industries; and (b) vary widely—from \$2.24 in industrial inorganic chemicals down to \$1.57 in fertilizers. He contends that chemical workers' productivity has increased an average of 53% since 1949 (while earnings have risen 48%). He warns that continued productivity gains may lead to lower employment in this industry "unless the exceptional production growth rate of the past [eight] years continues."

Another productivity/earnings study out last week lists all-manufacturing productivity as having climbed by 33.8% from its 1947-'49 average, while labor costs per unit of production mounted by 25.6%. During 1956, however, the productivity gain was only 2.8%, while the rise in unit labor costs was 4.8%. Assorted arguments based on all these figures will long echo in 1957's bargaining.

Personnel Perorations: Two chemical company executives will have speaking assignments at the mid-winter personnel conference that the American Management Assn. has scheduled for Feb. 13-15 in Chicago. Matthew Gouger, vice-president and director of personnel relations for General Aniline & Film Corp. (New York), will take part in a debate on decentralization of the personnel operation in a multi-plant company. Board Chairman James Stiles, Jr., of Abbott Laboratories (North Chicago) will speak on what to tell employees about one's company and why. Another feature of the conference will be an analysis of a company personnel department's responsibility, in effecting a merger, of integrating predecessor companies' personnel policies.

Gas Issue Still Hovers

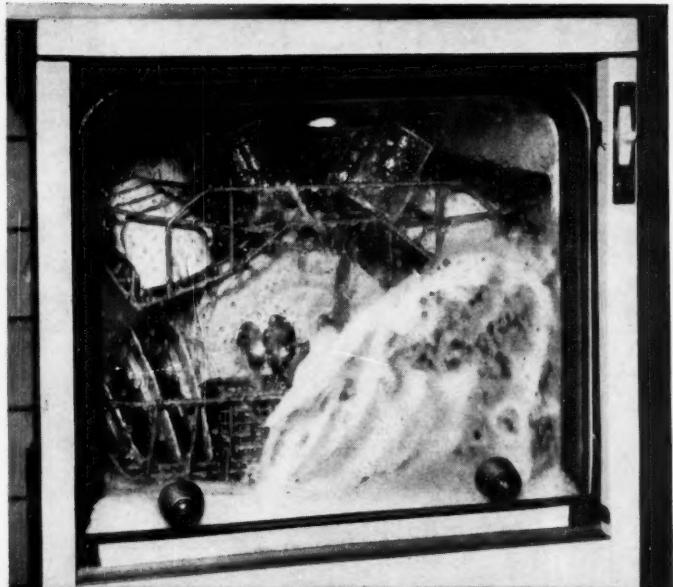
Though chemical process management already seems to have decided to locate new plants whose operations are based on natural gas within states where gas supplies are produced, the issue of supplies and prices of natural gas going into interstate pipelines is still very much up in the air.

Over the 11 months since President Eisenhower vetoed the Harris-Fulbright bill, which would have re-established state control over prices—and thus, supplies (CW, Feb. 25, '56, p. 21), process companies have largely played it safe by picking sites in gas-producing states, thus skirting the danger of having a costly new plant in some other area where gas producers' possible future refusal to sell to a pipeline concern may mean a plant slow down or shut down.

But the issue is far from settled. Just last week, while Congressmen from gas and oil states were getting set for a new fight to end federal regulation of rates on gas sold to pipelines by independent producers, two court decisions have been issued which tend to reinforce the Federal Power Commission's authority in this domain.

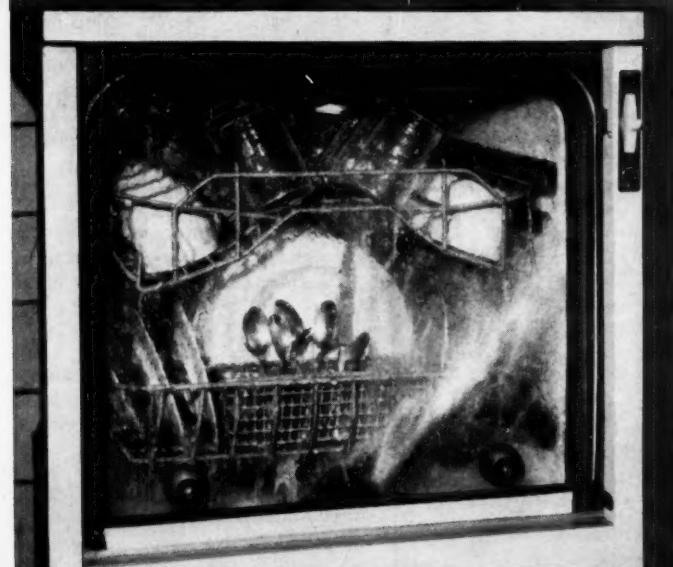
In Washington, the U.S. Supreme Court declined to review a case based on protests by 12 major gas-producing companies against FPC's plans for regulating their rate schedules.

And in Austin, Tex., a state district court set a precedent for weakening of state control over gas processors. Judge Charles Betts ruled that the Texas Railroad Commission—the state's petro-



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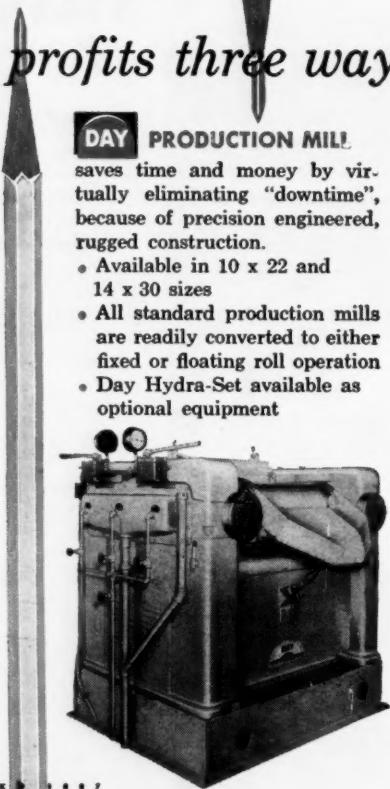


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ADMINISTRATION

leum regulatory agency—must stop enforcing its order requiring a natural gas processing plant to handle gas from all local producers on an equal basis.

Both disputes are still open. While the 12 big producers have failed in their attempt to block the FPC's initial procedural move, they can still do battle—individually—against any substantive actions by the agency relating to their respective rate structures. And the Texas state government is planning to appeal Betts' decision. In fact, attorneys say that this case may eventually go to the U.S. Supreme Court if the state-vs.-federal jurisdiction question isn't settled in the meantime.

KEY CHANGES

H. E. Bramston-Cook, to director; and **N. E. Hathaway**, to general sales manager; Oronite Chemical Co., San Francisco.

W. Earl Dunn, to vice-president and general manager, Chemical Plants Division, Blaw-Knox Co. (Pittsburgh).

Willis W. Osborne and **Fremont F. Clarke**, to senior vice-presidents; and **R. B. Ellestad**, **Walter M. Fenton**, **J. Dean Herman** and **J. D. Campbell**, to vice-presidents; Lithium Corp. of America (Minneapolis).

Robert H. Brown, to asst. director of research laboratories; and **Charles J. Walton**, to chief, chemical metallurgy division; Aluminum Co. of America.

Jack D. Lee and **Charles B. Compton**, to vice-presidents, Southern States Phosphate and Fertilizer Co. (Savannah, Ga.).

Wesley Wickersham, to vice-president, International Division, Allied Chemical & Dye Corp.

Clarence A. Stiegman, to director of product development, Hooker Electrochemical Co.

Lucien J. Sichel, to vice-president and counsel, CIBA Pharmaceutical Products.

Albert B. Scott, to director of research and product development, Central Pharmacal Co. (Seymour, Ind.).

Thomas D. Parks, to vice-president, research, Clorox Chemical Co. (Oakland, Calif.).



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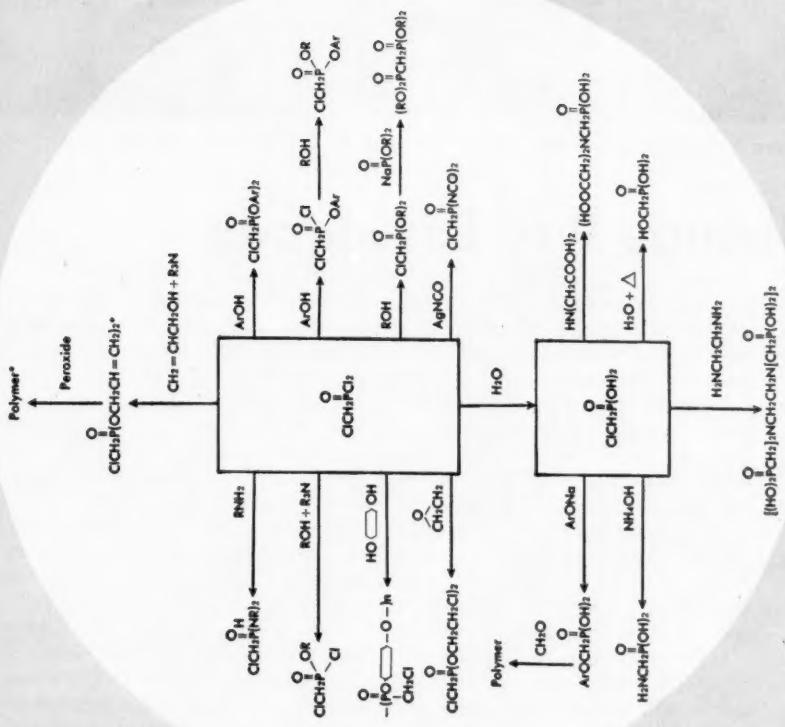
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SALES AND DISTRIBUTION



T-H TOP MANAGEMENT: Chairman C. T. Thompson talks politics, President R. S. Thompson watches costs.

Tight Purse Strings Pay Dividends

"I believe a company should try to be different . . . it should advance some political views no matter who might be offended," says Charles Thompson, chairman of the board of Thompson-Hayward Chemical Co. (Kansas City) and a man of strong ideas. Among his political viewpoints (which he distributes along with chemicals to midwestern business men) are repeated references to the dangers of bigness—both in government and business.

He feels so strongly about this subject that he has several times refused to sell his chemical distributing company to larger firms that have come courting with handsome offers. Yet today Thompson's company, paradoxically, is itself big.

The only larger chemical distributors, in fact, are McKesson & Robbins and Van Water and Rodgers. And McKesson & Robbins is bigger says T-H, only because it bought out the West Coast's Mefford Chemical Co. As a matter of fact, Thompson-Hayward, too, seriously considered buying Mefford, but decided not to stray from the Middle West.

Annual sales have risen from \$5.5 million in '41, to \$8.5 million in '45, to \$15 million in '50, to last year's \$28 million. Over the past three years,

the firm has opened a new branch, added to facilities at nine others. It is now looking for space to set up a branch in Shreveport, La.

Pesticides account for about 20% of T-H's business. Industrial chemical sales are about twice as big. Feed supplements bring about 30%, and the rest comes from the Carman Div., a dry cleaner and laundry supply service purchased in 1954, mainly for its attractive day-by-day aspect. The Carman Div. is kept separate, with its own sales force.

Stay Liquid: Although it was founded in 1917, most of Thompson-Hayward's branches were established during the depression. Money to make this possible was provided by Charles Thompson's practice of keeping the company liquid, and plowing back World War I profits.

Unlike some of his political pronouncements (on which the elder Thompson sometimes has to backtrack when principals complain), his doctrine of financing from within and remaining liquid, is holding fast. The company has never borrowed money for expansion; all stock is still held by people in the company, the Thompson family, and the retired Hayward. The company borrows only on short-term notes to finance inventory (now \$4

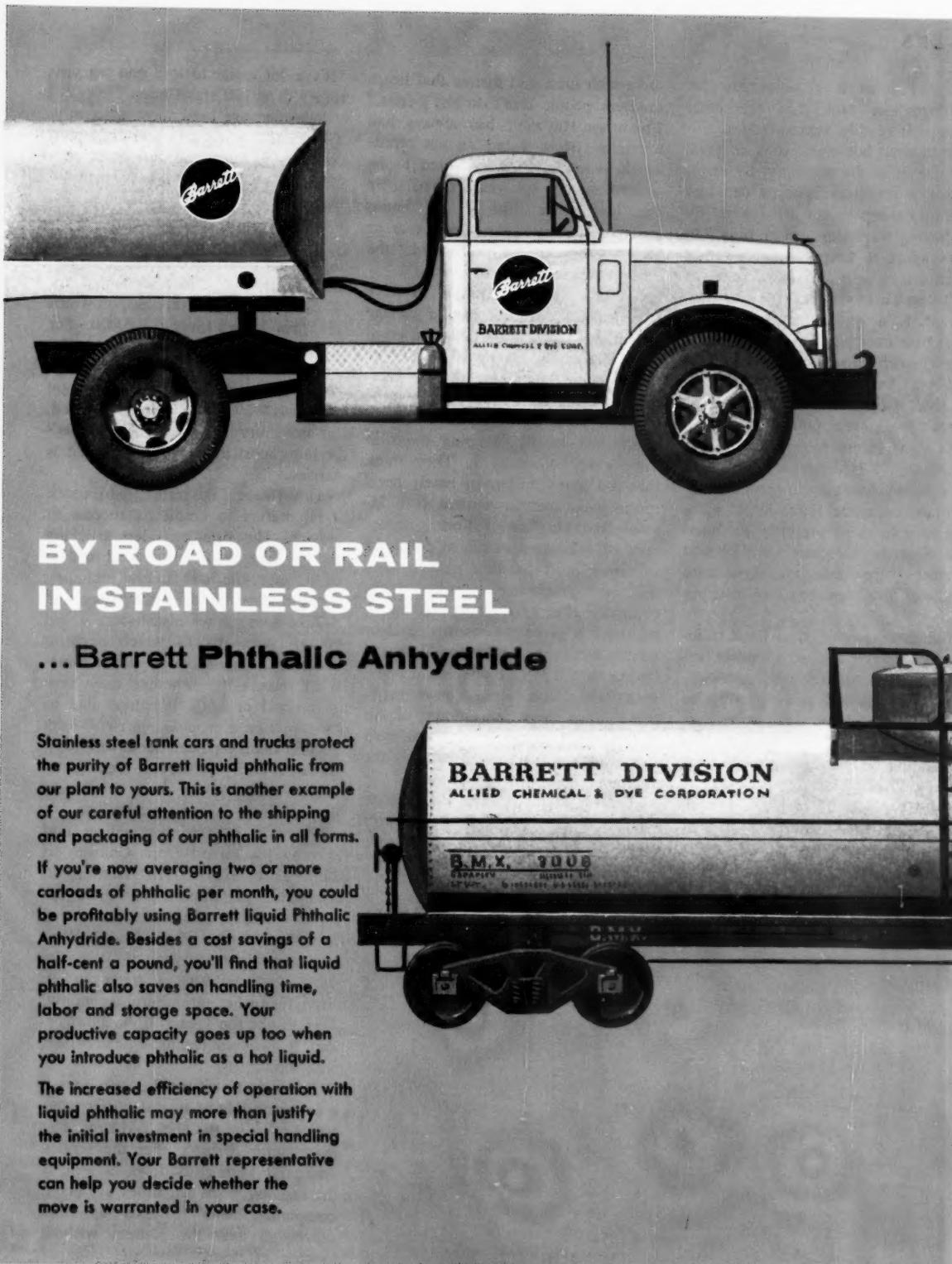
million, with \$2 million in accounts receivable). These loans have so far been obtain at a favorable rate, often at a prime 4%.

Now, however, with cash on hand down to \$800,000, and a record of several years without dividends, the firm is seriously considering selling stock. "You reach a point where it's difficult to grow from within," says young Thompson. "There's as much danger in doing too much business for your capital as in not doing enough."

Tight Credit: Another of Thompson's prized rules of business is to be hard on credit. Since it went into the laundry supply business, a poor credit field, T-H's credit rules have relaxed somewhat. The old rule, "never ship to anybody if his account is overdue," now is not always rigidly enforced.

But T-H credit is still tough to get. Somewhat to its surprise, however, it finds that the laundries and dry cleaners—and rival suppliers—are adjusting. "It's amazing how, when one strong jobber in a field takes a position, the others follow," says the younger Thompson.

Refusal to carry overdue credit is only one of the ways T-H keeps its costs down. T-H's refusal to entertain or give presents to purchasing agents is undoubtedly another factor



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SALES

that has given it a reputation for "tightness"—a fact that the elder Thompson readily acknowledges.

Economy, however, runs a good deal deeper in the company. By maintaining a liquid position, it can buy inventory when prices are lowest. By not having warehouses more than 250 miles apart it keeps shipping costs down.

Eye on Turnover: Perhaps more important is a quick turnover. Their items turn over an average of 6 times a year, with some going as high as 12 times. Any of those that turn over less than 4 times are considered close to the break-even point (except for some high margin specialties).

Although T-H figures it must carry some slow, low-margin products to maintain complete lines, it is beginning to give these products a second look. Some manufacturers will be told to either figure out how to allow more margin or take over their own distribution.

Branch managers, who have traditionally enjoyed almost complete autonomy, (some used to remain unvisited for 10 years at a stretch), are also coming under closer supervision. Executive committees now meet to discuss adding or keep unprofitable lines in warehouses.

Highest Goal: Becoming a branch manager is the highest goal T-H dangles before its salesmen. "We show

them with facts and figures that headquarters people don't do any better." Thompson-Hayward has always had a bonus system based on net profits of the company. "We wanted to be generous in good years, sparing in the bad years. But if the bonus isn't bigger every year—good year or bad—employees are disgruntled," the elder Thompson says wryly.

Salesmen aren't required to have technical training, not even a college education. More important, the company thinks, is having a "high-type moral man." Believing that a salesman should be a family man, they make a point of hiring men already established locally, keeping them in town every other week. They think that too many nights in lonely hotel rooms make men susceptible to "character-destroying" temptations.

Most important of all, of course, a salesman must produce orders. If a man isn't producing a profit for the company after two years, the branch manager is given six months to clear up the situation. Thompson-Hayward figures that it loses money on a salesman if he doesn't show a gross profit that is four times the amount of his direct selling expenses. "Break-even men aren't good enough today," the younger Thompson says firmly.

Another T-H dictum: concentrate on the small customers, don't worry about snaring big accounts. Reason:

"It's a lot easier to lose one big customer than 100 small ones."

Salesmen are used most efficiently, T-H thinks, when they are bringing in commission sales: the distributor concentrates on getting the order and the manufacturer handles shipping and sometimes even billing.

Commission sales are an increasingly important part of the T-H picture. Last year they accounted for \$3.5-\$4 million of total sales, on which the firm netted over \$200,000. For Thompson-Hayward, this is highly desirable business: the commission is about the same as the normal margin (around 5-7%); no risk is involved; no inventory is bought; and—what's perhaps most important—no credit is carried.

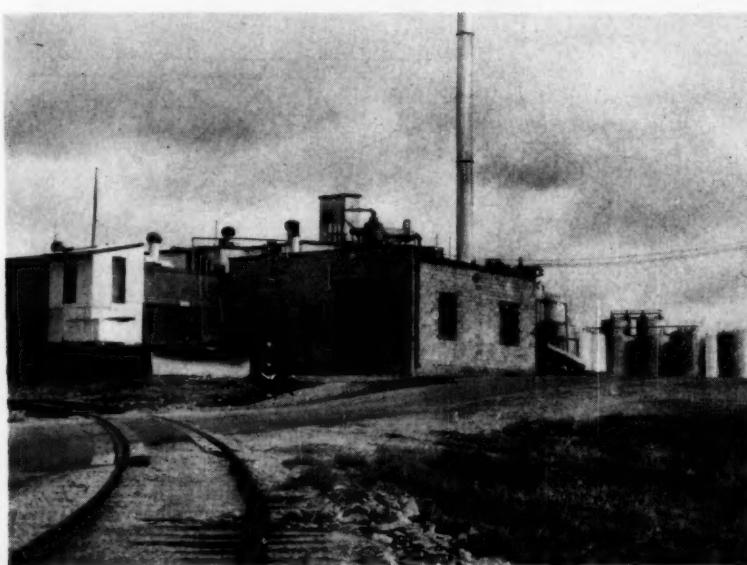
Hub-Deep: Like most distributors, T-H prefers to credit its success to service. The firm considers trucking the last frontier of service and its fleet of 73 over-the-road units (including trailers) are hub-deep in pioneering.

Like some other distributors it has route trucks—trucks which cover a route on a regular basis—albeit somewhat reluctantly—whether they have a payload or not. "We don't like to operate like a licensed carrier," says general manager Fred Goodwin. "But through such extras as picking up empty carboys, the route trucks do provide sales-drawing service."

With 20 branch sales offices and warehouses spread from Chicago to Lubbock, Texas, from Denver to Memphis, Thompson-Hayward believes that its future is pretty well tied in with the future of the Middle West and distributors in general. With decentralized industry coming in to strengthen the agricultural economy, T-H thinks the area will do all right, and it believes chemical distributors will, too.

The main threat to all distributors—a sweeping tide of manufacturer sales activity—is on the ebb, T-H says. The manufacturers can't offer the service and can't keep costs down as well, is the reasoning. "When times are good, companies begin to open up sales offices all over the country without looking at costs," says the younger Thompson.

Since that time, however, chemical manufacturers' profit margins have narrowed considerably. Smiling, Thompson adds: "Now they're beginning to look."

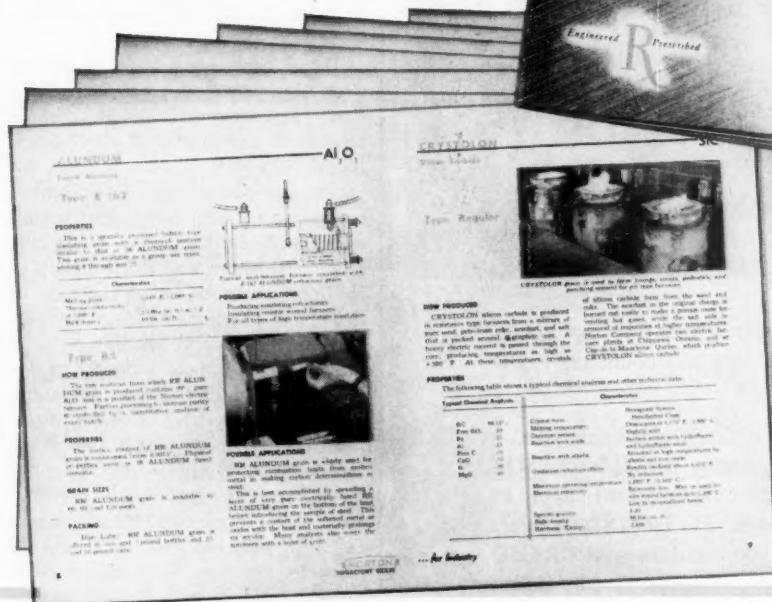


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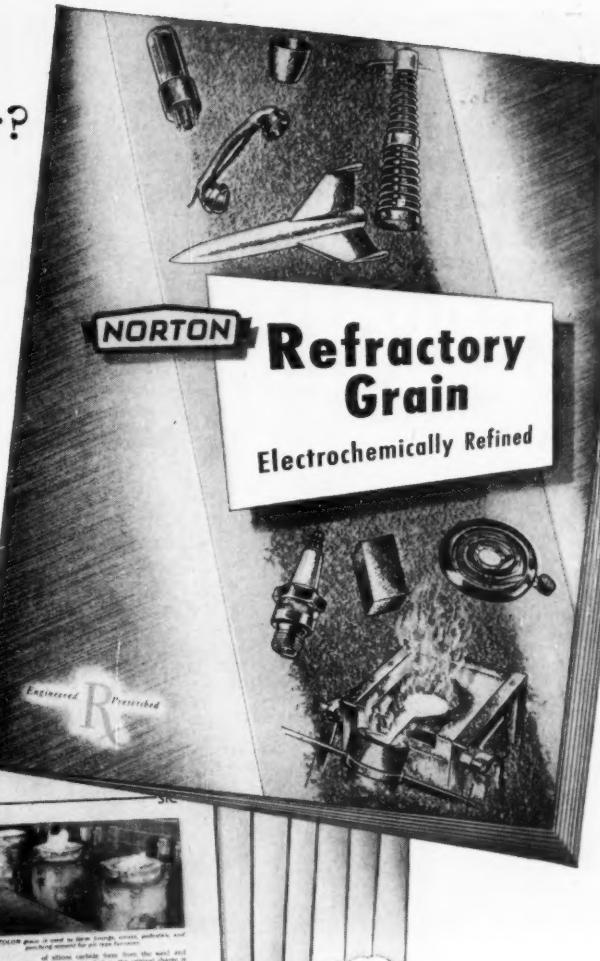
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SALES

Pittsburgh Organizes

Taking a cue from the Steel City's lusty self-improvement program, Pittsburgh's chemical sales and marketing men have formed two new professional groups: the Chemical Sales Association of Pittsburgh and the Pittsburgh Chemical Marketing Club.

The first group, chaired by G. J. Esselen III of Pittsburgh Coke & Chemical, already claims forty members out of the approximately sixty chemical salesmen in the Pittsburgh area.

Formed last year, CSAP is apparently patterned after SAACI (Salesmen's Association of the American Chemical Industry) in New York. The organization aims to foster and promote greater interest in chemical selling, encourage wider acquaintance among those engaged in selling, promote development of high professional standards and ethics.

The Pittsburgh Chemical Marketing Club has 30 members recruited chiefly from marketing and market research men. J. S. Doerr of U.S. Steel Corp. is PCMC's first chairman, says his group provides a place for chemical marketing men to gather for "educational and social purposes." The club might also serve a useful function in facilitating word-of-mouth exchange of marketing statistics—often the only way such data is circulated.

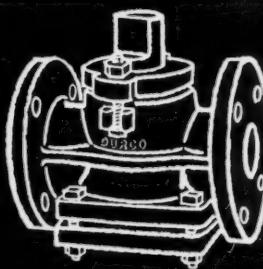
Both groups meet monthly at the same location. But there the resemblance ends, say both chairmen. Prospective membership lists of the group, for example, do not overlap.

The mere fact that two such groups have been organized almost simultaneously tends to lend added importance to Pittsburgh-area chemical industry—until recently the baby brother in a family of industrial giants.

Although Pittsburgh's two new groups are still in the toddling stage, they could eventually contribute significantly to the area's continuing industrial development.

CW Report
Coming February 9

CW report author analyzes compensation afforded top chemical management. His conclusion: compensation rates haven't kept pace with those in other industries.



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METRIC MELEE LINE-UP

In Contest: Metric label weights, metric package sizes, metric pricing and metric billing for raw materials purchased by the drug industry.

In Favor:

Several large pharmaceutical companies, most purchasing agents for drug makers, Bureau of Narcotics.

Reasons:

Simplification of record-keeping, calculation of production runs, packaging and purchase requisitions.

Neutral:

American Pharmaceutical Manufacturers Assn., American Drug Manufacturers Assn. and the National Bureau of Standards.

Opposed:

Suppliers of fine chemicals, reagents and heavy chemicals to the drug industry.

Reasons:

Move would result in long, costly mathematical conversions, would lead to dual pricing, records, inventories.

Metric Switchover Triggers a Brawl

Eli Lilly's recent disclosure that it is putting production and sales operations on metric measure has sharply jolted the pharmaceutical industry and sent a cold shudder into the sales departments of most pharmaceutical raw-materials suppliers. Other drug companies, moreover, are planning similar moves.*

Parke, Davis, Wm. Merrell, Wyeth, Sharpe and Dohme Div. of Merck, and several Canadian companies are among those making the switch. Conversion is also under serious consideration at Chas. Pfizer and Smith, Kline & French, Hoffmann, La Roche, Ciba Pharmaceutical and Squibb are now on the metric system.

In favor of the move to metric measure are purchasing agents for most pharmaceutical companies, and many operating departments of these firms. That's because vitamins, antibiotics and many new products carry metric weights, but older products are generally labelled in apothecary or avoirdupois units.

Production runs are calculated in

terms of one system; labeling and purchasing requisitions, on the other hand, often utilize another. Besides the extra work and cost of converting units from one system to another, there's new opportunity for error with each calculation required.

Suppliers to the pharmaceutical industry—all of whom use avoirdupois measure—are not enthusiastic about the move. Says one sales manager for a reagent producer: "We would rather have a second-best system of weights and measures than two systems." Suppliers' objections to metric labeling, packaging, pricing and billing are these:

- **Dual work.** Since chemical suppliers sell to many industries besides the pharmaceutical, conversion would mean duplicate labeling, price lists and dual record-keeping.

- **Dual inventories.** If conversion leads to demands for metric package sizes (and some drug buyers believe and hope it will), costly dual inventories will be necessary.

- **Pricing.** If one drug company recommends avoirdupois metric conversion factors that are not as precise as those of another, suppliers will arrive at different prices for the

same product—depending on the customer.

And the difficulty in calculating the "price break" (e.g., 80-lb. vs. 50-kg. bag), could lead to different price scales. Such a situation could lead to Federal Trade Commission action (under the Robinson-Patman Act) regarding price discrimination.

- **Education.** All who do distribution paperwork would have to become familiar with the metric system—a substantial educational task.

"What Are You Going to Do?" How far are suppliers willing to go along with metric distribution? In a spot check, *CHEMICAL WEEK* found most (in fine, reagent and heavy chemicals) reluctantly willing to stencil or mark metric weights on standard, avoirdupois-size containers. Suppliers exhibit some resistance to metric pricing and billing, but as one reagent-company spokesman put it, "What are you going to do? Lilly's a major account. We'll go along." None of the companies contacted by *CW*, however, will supply metric-size packaging.

Lilly reports good supplier cooperations, says only one company to date has flatly refused. Willing to pay any extra cost (if it can be justified) that

*A measure of the subject's importance: the Chemical & Allied Buyers Group of the National Assn. of Purchasing Agents is adding a discussion of the topic to the program for its midwinter meetings (CW Jan. 19, p.46).

Weed killers?



● "Phenol is the backbone of the thermosetting plastics industry."

But the wide range of other products which use some form of phenol is indicated by the illustrations here.

Whether you make weed killers, oil additives, plasticizers, synthetic resins, explosives, dyes, disinfectants, or pharmaceuticals, you can count on Reichhold as a dependable source for top quality phenol.

Oil additives?



What's your need
for top quality
Phenol?

With RCI PHENOL you can be sure of quality control because *Reichhold not only sells its phenol but uses it*. RCI produces phenolic resins for everything from high pressure laminates to plywood glues.

RCI can deliver phenol to you fast in any part of the country—in drums or tank cars, whichever suits your storage facilities. Next time you need phenol, in any quantity, get in touch with Reichhold.

Creative Chemistry . . .
Your Partner in Progress



REICHHOLD

Synthetic Resins • Chemical Colors • Industrial Adhesives • Plasticizers
Phenol • Formaldehyde • Glycerine • Phthalic Anhydride
Maleic Anhydride • Sodium Sulfite • Pentaerythritol • Pentachlorophenol
REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.



ANTI-SLIP COATINGS FOR CONTAINERS

...another new use for Du Pont LUDOX®

"Ludox" colloidal silica, one of Du Pont's most versatile chemicals, is performing another vital service for industry.

Now, it's helping make multiwall paper bags and corrugated cartons safer and better-looking than ever, providing anti-skid characteristics at very nominal cost. Bag and carton makers are coating *smooth* paper with "Ludox"—get excellent slip resistance and improved appearance. Moreover, smooth paper offers a far superior printing surface . . . makes labeling easier and the top coat of "Ludox" minimizes ink smear.

Container coatings based on "Ludox" effectively increase surface

friction. Treated containers can be stacked solidly, safely.

Versatile "Ludox" has found many other novel uses in industry. It is well known for providing slip resistance in floor waxes . . . it reinforces latex foam rubbers . . . strengthens textile fibers . . . retards soiling of rugs, carpets and painted surfaces . . . is used to pre-coat photosensitive papers for better contrast and as a bonding agent for inorganic fibers. "Ludox" may be the answer to problems in your business. Why not write for more information today?

E. I. du Pont de Nemours & Co. (Inc.)
Grasselli Chemicals Department,
Wilmington 98, Delaware

DU PONT
REG. U. S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

LUDOX®
COLLOIDAL SILICA

SALES

special consideration entails, Lilly will not, however, insist on conformity.

The American Pharmaceutical Manufacturers Assn. and the American Drug Manufacturers Assn. are neutral in the matter. Spokesmen for both groups point out that opinion is divided. The National Bureau of Standards is also neutral.

The Treasury Department's Bureau of Narcotics, however, has endorsed the metric scale for narcotics and will accept Lilly's statistics in metric values. Lilly is now sounding out the Alcohol Tax Unit on furnishing data in metric form.

Alcohol tax unit officials tell *CW* that the Lilly request "is under consideration," that a lengthy report will be issued. The Bureau of the Budget, in overall charge of business data reported to the government, is making no move to change to the metric system. The Tariff Commission states it is unaware of any regulation requiring avoirdupois units in reports it receives. Should metric-unit reports come in, they would be converted to avoirdupois, says the Tariff Commission.

North of the Border: Solidly behind metric labeling for drug products, Canada's Food and Drug Directorate is urging all producers to convert labels. Although the change is on a strictly voluntary basis now, specific regulations and enforcement procedures can be expected, one top-level source tells *CW*. Charles E. Frosst, Ayerst McKenna and Harrison Ltd., Abbott Laboratories Ltd., Parke, Davis Ltd. and Frank W. Horner Ltd., have or are in the process of converting. Most request (but do not insist) that suppliers label, pack, price and bill raw materials in metric units.

Parke, Davis reports that about 20% of its suppliers in Canada quote some prices metrically but less than 1% use metric measure in labelling and shipping. The Canadian Pharmaceutical Manufacturers Assn. is preparing a table showing apothecary weights and metric equivalents to submit for membership approval.

With large and small drug makers swinging to the metric system, it's unlikely that the trend will peter out. "The switch," one fine-chemical sales manager insists "is coming. We can't stick our heads in the sand. We will have to adjust . . . and the sooner the better."



Better-known
in Bhowani Junction
than we are
in Boston?

Penick recognized years ago that international trade must be a two-way street. So export and import became inseparable twins that now account for a substantial portion of our business. And because we obtain our basic materials from practically every civilized country in the world, we're frequently better-known in many parts of the world than we are at home.

Here, even our best friends all too often associate Penick with botanicals alone *although more than three-quarters of our business is in manufactured products!*

From Penick plants flows a diversified range of drugs and fine chemicals* used by more than a hundred different industries. Many are derived from the botanicals for which we are famous. Alkaloids and extracts are good examples. They're used in medicine, foods, cosmetics and in some of our most important pesticides. Others such as our line of specialized antibiotics are in no way related to botanicals.

The essential fact is that Penick offers you a single source for many different chemical needs. You benefit by our broad experience in many related fields. Problems in one are frequently solved by knowledge gained in another. If you do not know all the ways we can serve you, we shall be happy to send particulars in response to a letter outlining your needs.

*and many fine chemicals also available from our affiliate,
The New York Quinine & Chemical Works, Inc.

PENICK

Manufacturers of Fine Chemicals and Drugs

S. B. PENICK & COMPANY 50 CHURCH ST., NEW YORK 8 735 W. DIVISION ST., CHICAGO 10

SPECIALTIES



Specialty products can rack up good through-the-mail sales figures if manufacturers know . . .

How to Sell to the Mail Order Seller

Most retailers don't like the months of January and February; the winter's cold winds keep customers away in droves. For the chemical specialties makers who supply them, this can mean a depressing winter letdown in sales.

But there's little letdown for those who sell to a class of retailer that feels a warm glow for icy weather outside—the mail order specialties seller. His customers can buy without leaving home.

How good are mail order houses as specialties sellers? A *CW* survey finds most of them aggressive merchandisers whose vigor has allowed them to grow at twice the rate of department stores.

Quick to capitalize on such factors as the do-it-yourself craze, the population shift toward the suburbs, the increasing home-orientation of society and growing amount of leisure time enjoyed by the public, the mail order houses can be valuable outlets for specialties.

In selling this market, there are several things to keep in mind:

- A mail order item must have a strong novelty appeal, it can't be the sort of thing readily available at the corner drug store.

- It can be an item stocked by department stores, but should not be the type of product usually given prominent display.

- To move well as a mail order item, an item should be one used in the home, preferably a labor-saving device.

If you're going to sell via a mail order house you also have to have a product which will appeal strongly to women. Men do comparatively little mail order buying. One mail order seller told *CW*: "If we can't beam the product message to women, we're not interested. A man might rip an item out of one of our catalogs in an I'll-have-to-send-away-for-that some day mood, but we'll never see that order. If we had a sale for every clipping gathering lint in some fellow's pocket, we'd outsell Sears."

How Exclusive? Despite the emphasis on novelty (the importance of having an item which other retail

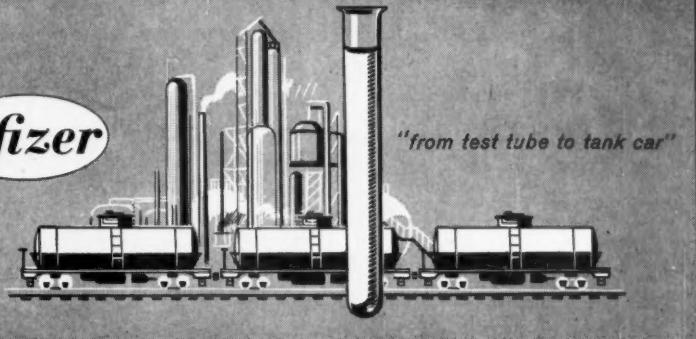
outfits don't carry), there doesn't appear to be any requirement that a specialty be exclusive to one mail order house. Few actually expect to get them.

Mail order companies* watch competitors closely, are quick to go after what looks like a good seller in a rival's catalog. And it's fairly easy to see which items are moving well. A product seldom shows up for a second time in a firm's catalog if it doesn't succeed in its first catalog appearance. As a rule, one third of the new items click, another third break even. The rest are "dogs."

The advantage to the mail order house that takes the first chance on a specialty is about a three-month lead on competition. It takes that

*Firms covered in this article include such mail order sellers as Breck's (Boston), Damars (Elizabeth, N. J.), Spencer Gifts (Atlantic City, N. J.), Carol Beatty and Sunset House (both of Los Angeles) and House of Schiller (Chicago), but not the "Big Four" of the business—Sears, Wards, Aldens and Speigels—whose operations differ so substantially from those of other mail order houses as to distort a general story on selling to the mail order house. A directory of mail order houses, first published in 1955 and soon to be reissued in an enlarged edition, lists 2,000 mail order houses, is available from B. Klein Publishing Co. (New York) for \$15.

product news from **Pfizer**



"from test tube to tank car"

VERSATILE ORGANIC ACIDS AVAILABLE IN QUANTITY

When Pfizer opened the world's first successful citric acid fermentation plant in 1923, the world price of citric dropped more than two-thirds! Since that time Pfizer leadership in fermentation chemistry has made many other useful acids available to industry in quantity.

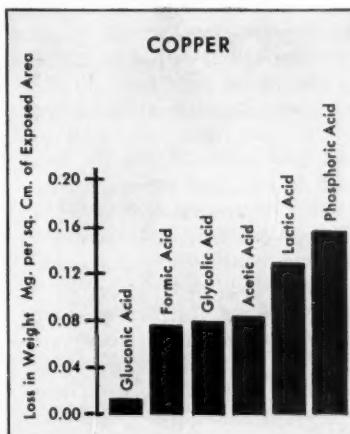
CITRIC ACID

Pfizer offers citric acid in both anhydrous and hydrous forms. With Pfizer's anhydrous form of citric acid, you save money in reduced freight costs. Why pay freight for 8½ lbs. of water per each 100 lbs. of citric shipped? In addition the anhydrous form offers the advantage of ideal quality control since there is little or no variation in moisture content.

Citric acid is a relatively strong acid notable for its nontoxicity, its sequestering ability and the number of chemical reactions it will undergo. Pfizer also offers citric acid salts and five esters in commercial quantities. These are Triethyl and Tributyl Citrates as well as their acetylated forms. Acetyl tri-2-ethylhexyl citrate is also available.

GLUCONIC ACID

By the fermentative oxidation of glucose, Pfizer produces gluconic acid, which it offers as a 50 percent aqueous solution and in the form of stable salts. Gluconic acid has a low order of toxicity, is extremely mild and non-corrosive and has excellent sequestering properties. Tests at Pfizer have shown that 1N gluconic acid solutions affected metals less than any of five other mild acids. Consider copper for example:



OXALIC ACID

Pfizer developed a fermentation process which yields oxalic acid in a high degree of purity. One of the

outstanding features of this strong acid is its ability to solubilize iron oxide. Pfizer Oxalic Acid is available in granular and fine granular forms. Ammonium, ferric ammonium, ferric and other oxalates are also available.

TARTARIC ACID

Crystalline deposits in wine fermentation vats provided the raw material from which Pfizer began producing high purity tartaric acid in 1862. Like citric and gluconic acids, tartaric acid is notable for its low toxicity and its sequestering activity.

ITACONIC ACID

Pfizer skill in fermentation has made industrial itaconic acid a reality. Two carboxyl groups, a conjugated double bond and an active methylene group make itaconic acid a reactive and versatile molecule. Itaconic esters, readily prepared in high yields, can be polymerized and may serve as useful plasticizers. Polyesters of itaconic acid and glycols may be polymerized or copolymerized to hard thermoset resins.

You can order versatile PFIZER ORGANIC ACIDS in large tonnages. If you want further information on any of them, write us outlining the type of application you are considering. Pfizer Technical Service can help you with extensive data on organic acids.

Manufacturing Chemists
for Over 100 Years



CHAS. PFIZER & CO., INC.

Chemical Sales Division

630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.;
San Francisco, Calif.; Vernon, Calif.;
Atlanta, Ga.; Dallas, Texas

PHYSICAL PROPERTIES OF ITACONIC ACID	
CH ₂	Formula H ₂ C ₅ H ₄ O ₄
II	Molecular Wgt. 130.10
C-COOH	Appearance white crystalline powder
I	Melting Point 167-8° C
CH ₂ COOH	Solubility in Water
	At 20° C. 8.3 Gm./100 ml.
	At 80° C. 72.5 Gm./100 ml.

SPECIALTIES

long for rivals to move a product into their own catalogs. And this head start can add up to fast business for a specialties maker—it is not unusual for forty or fifty thousand units to be sold in this three month period.

How High the Price: A *CW* spot check of mail order catalogs indicates that chemical specialties—especially those that lighten the housewife's load—move well. Almost one tenth of the items listed were chemical specialties—and almost all were repeat items from earlier catalogs. Here's the price breakdown on the items carried: 19% listed were 50¢-99¢, 73% were between \$1 and \$2, of which 80% carried an even \$1 tag. Some 8% ranged in price between \$2 and \$2.98.

Almost all mail order houses expect to buy at jobber levels, about 55% off list price.

Weight's a Factor: A big item to take into consideration when offering a product to a mail order house is the price/weight ratio. As a rule, items that the mail order houses sell for less than \$2 must weigh less than 8 oz., packaged for mailing. Anything under 8 oz. can be mailed anywhere in the U.S. or its possessions for one cent per ounce. On the other hand, a package weighing over 8 oz. is classed as parcel post—and such rates are figured on a pound-and-mailing-zone basis. Where an 8-oz. item goes from New York to San Francisco for 8¢, a 9-oz. package requires 30 cents postage for the same trip. Some mail order houses request a buyer pay postage charges, but these charges are more often than not ignored by customers.

Right Approach: How must one approach a mail-order firm? Most of them prefer being contacted by mail. The ideal presentation usually includes a sample of the product, a glossy 8 x 10 photograph (preferably an in-use shot), full product literature, and a 60-80 word description of the item for catalog use.

First orders are usually token, range from 36 (the smallest figure quoted to *CW*) to about 1,000. But once an item catches on, mail order houses expect firms to supply re-orders in a hurry.

How soon should a manufacturer be able to deliver on a reorder? Most often heard answers: "immediately," or "overnight."



BLACK STAR

DRINK-PROOF BOTTLE: It's a key to selling liquid "aspirins."

Drop on the Aspirin Market

Most people, familiar with the ease of swallowing one or two aspirin tablets, only shake their heads in wonder when they hear that liquid "aspirins" are being test marketed.

But two firms—Martin H. Smith Co. (New York) and Johnson & Johnson (New Brunswick, N. J.)—are out to change this head-shaking wonderment into head-nodding acceptance.

In marketing their liquid salicylamide-containing preparations, the firms hope to cash in on a very definite market for analgesic liquids—for administration to very young children or to adults who, after operations such as a tonsillectomy, have trouble taking pills. Convenience and versatile miscibility are offered these users by the new liquids.

It's still pretty much of a speculation as to how big the market for children's aspirin actually is. Bristol-Myers looked at it a few years, came up with an estimate of \$4 million/year, and promptly lost interest. Plough, Inc. (Memphis), whose St. Joseph children's aspirin is the largest seller in the field, figures the over-all yearly market lies somewhere between \$5 and \$10 million.

Johnson & Johnson, however, thinks all these guesses are too conservative—at least in giving a fair picture of the liquid "aspirin" market. A heartily vague spokesman enthuses

about a market many times bigger than \$4 million, thinks it might go up into the "umpteen" million/year range.

First Served: Smith's Dropsprin, an aqueous, milky-color flavored suspension of salicylamide, was the first on the market. The small ethical drug house took over the product from the originator, Crossley Pharmaceutical Co., when Crossley realized that as an even smaller firm, it couldn't handle the business it had engendered.

Dropsprin, now going into New England markets, has no consumer promotion, is relying instead on counter displays and advertising to doctors. One of Smith's big hopes is that Dropsprin will eventually find itself used in many prescription elixirs.

Second Up: Johnson & Johnson's Liquiprin, now being test marketed in Lafayette, Ind., Phoenix, Ariz., and Columbus, O., is similar in composition to Dropsprin, but is being promoted to consumers. Although J&J sees a big market for Liquiprin, it isn't moving fast, expects to stay in test markets for some time. The most promotable feature of Liquiprin is its "safety" bottle. Using an enclosed calibrated dropper is the only way the contents can be removed. It cannot otherwise be spilled, cannot be drunk from the bottle by children.

Smith, impressed by this innovation,

WHEN YOU SHIP

IN STEEL CONTAINERS

Consider these facts about

There are three good, basic reasons why SSIRCO drums are your best buy in steel shipping containers.



PRODUCT SSIRCO standard containers are made from high-grade hot or cold rolled steel and are built to take rough treatment almost indefinitely without seepage or leakage. They are manufactured under rigid quality control standards to assure serviceability.

Drums are manufactured on a modern, semi-automatic container production line which handles both heavy- and light-gauge metal containers. This production line consists of rolling, flanging, light and heavy welders, swedging and seaming machines, horn presses, combination blanking and drawing presses. The finishing section is equipped with a five-stage degreaser and phosphatizing unit, paint unit, baking oven, lacquer painting unit, and oven for inside drum liners. This modern machine enables SSIRCO to handle all types of high bake phenolic linings, as well as clear, pigmented, or other type linings required for special uses.

QUALITY SSIRCO has produced high quality drums consistently for thirty years. Drum users are able to rely on SSIRCO for safe and dependable storage and shipment of their goods because of this built-in quality of SSIRCO drums. Ideal for shipping foodstuffs, chemicals, petroleum, and petroleum by-products, these containers can be lined with

high-bake phenolic or low resin-type finishes to meet specific quality requirements.

All standard drums manufactured by SSIRCO conform to current specifications as prescribed by CFC Rule 40 or the Interstate Commerce Commission. These drums also meet the Universal Standard Specifications adopted by the Steel Shipping Container Institute in conjunction with the Petroleum Packaging Institute and the Manufacturing Chemists Association.

All drums, both standard and special, are tested under water and by air pressure for leaks. Paint, both exterior and interior, is tested for the proper film thickness when wet and when dry to assure the highest quality containers possible.

SERVICE In addition to manufacturing a complete line of standard containers, SSIRCO is equipped to produce and deliver on time special drums and casings to specifications.

The Metal Container Plant is located in the heart of the South's steel district in Birmingham, Alabama. This metal fabrication plant contains over 60,000 square feet of space devoted to the servicing of your requirements with loading facilities for both railroad and truck shipments. Service on all drum orders is provided quickly and accurately.

**METAL CONTAINER DIVISION
SOUTHERN STATES IRON ROOFING COMPANY**

SINCE 1914

2830 FIFTH AVENUE, NORTH

BIRMINGHAM, ALABAMA

WHY CARRY A LARGE INVENTORY?



GET IMMEDIATE SHIPMENT FROM...



Maas

Minimum transportation time from the largest producer with the most complete line of phosphates and photo-pure chemicals in the West.

BUY MIXED CARS FROM MAAS:

ARMOFOS (tripoly) • TRISODIUM PHOSPHATE

DISODIUM PHOSPHATE • DRI-TRI (anhyd. tsp)

TETRASODIUM PYROPHOSPHATE • MONOSODIUM PHOSPHATE

SODIUM ACID PYROPHOSPHATE

Don't let large inventories be a burden.

Write for descriptive folder.



A. R. MAAS CHEMICAL CO.
Division of Victor Chemical Works
4570 Ardine Street • South Gate, Calif.



SPECIALTIES

is trying to develop something similar itself. Currently, it is working on a plastic squeeze bottle with a special orifice that will emit only 1 cc. of solution at a squeeze. When Smith is convinced that no more and no less is dispensed, it thinks it will have a "very competitive" product.

Neither J&J or Smith expects that it will have only the other one to compete with for the market. Small as the potential now seems to be, it is already attracting much interest. Both expect baby - aspirin - wise Plough to enter the field with a liquid St. Joseph product.

Self-Sterilizing Bottles

For some time now, makers of polyethylene and other plastic bottles have been prospecting for an antiseptic which could be incorporated in the plastic. Reason: with a melt index of 165 F, polyethylene can't be sterilized by normal steam and pressure methods. And now, Royal Manufacturing Co., Inc. (Prescott, Ariz.) feels it's struck pay dirt.

Royal, about the fourth or fifth largest maker of polyethylene bottles, eager to be first in the industry with a self-sterilizing bottle, selected a germ-killer already available—one which was already being used in plastic toys. A contract was signed with Bex Industries Inc. (New York) for exclusive plastic container rights to Bex's Corobex.

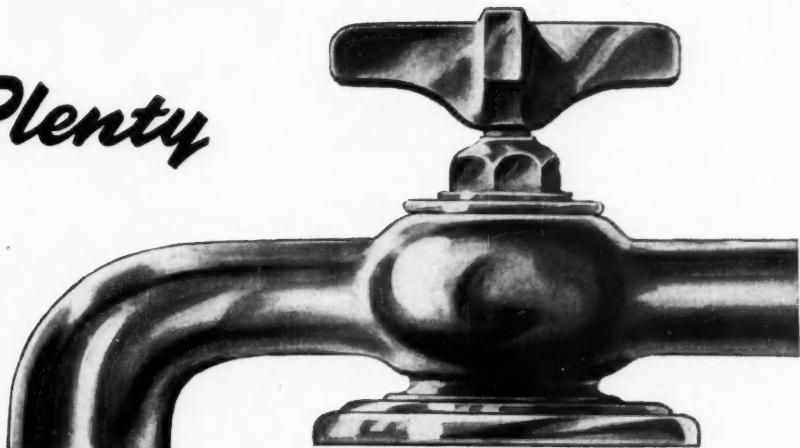
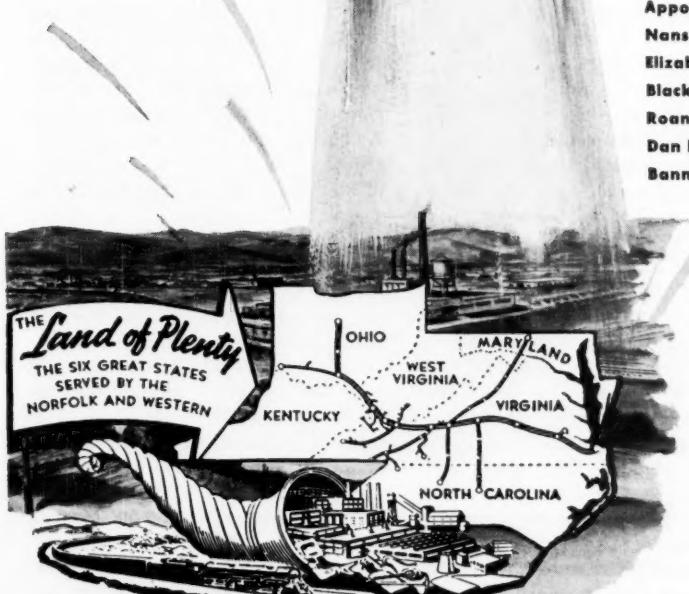
Since it doesn't have a patent yet, Bex won't talk about the composition of Corobex, will only say "there are many Corobex formulas adopted to different uses." Bex's price to Royal is \$25/gal. for a liquid which goes into the mold with the polyethylene pellets. A gallon will treat 5,000 lbs. of polyethylene. Although plastics take most of the Corobex output, it has uses on textiles and in room deodorants. It's now being tested in wax for wax paper food wrappings.

Heretofore, in order to sterilize polyethylene bottles for drug and pharmaceutical usage, they have had to be treated by electron radiation. This requires expensive equipment and doesn't offer lasting protection against contamination. Joining container makers in such research are antiseptic makers. Among these: Permacem Corp. (West Palm Beach, Fla.), which is trying to adapt its colloidal silver for plastic use.

in the

Land of Plenty

there's
plenty
of
water
for
industrial
use...



If an adequate water supply is an important consideration in the selection of your new plant site, as it is for most industrial site-seekers, then it will pay you to investigate the Land of Plenty where the annual rainfall is about 30 per cent above the national average.

It's a U. S. Weather Bureau fact that the annual rainfall of the 48 states as a group averages 31-36 inches, while that of the six states served by the Norfolk and Western is 40-45 inches. And not one of the states is below the national average.

In this land of many rivers, adequate water is but one of many natural and man-made advantages for industry. Detailed factual information about these advantages will be gladly furnished by our plant location specialists, in confidence and without obligation.

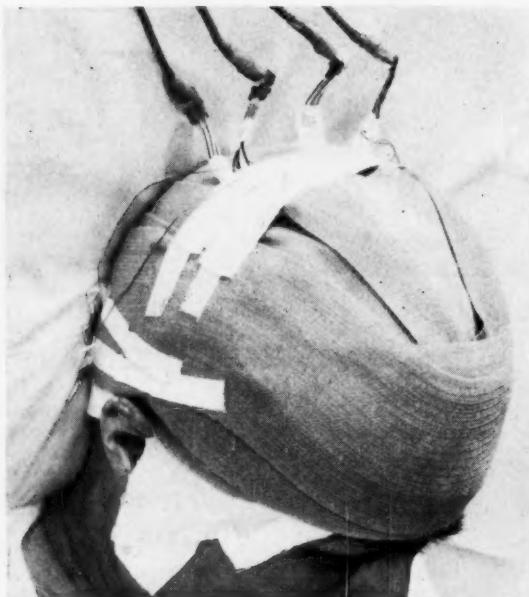
Land of Plenty rivers:

James River	Pigg River	Guest River
Appomattox River	Smith River	Bluestone River
Nansemond River	Mayo River	Big Sandy River
Elizabeth River	Potomac River	Ohio River
Black Water River	Shenandoah River	Little Miami River
Roanoke River	Holston River	Scioto River
Dan River	Clinch River	
Bannister River	New River	

Write, Wire or Call:

L. E. WARD, JR., Manager
INDUSTRIAL AND AGRICULTURAL DEPT.
Drawer CW-729 (Phone 4-1451, Ext. 474)
NORFOLK AND WESTERN RAILWAY
Roanoke, Virginia

**Norfolk
and Western
RAILWAY**



Electrodes inserted directly into the brain gauge human reactions to strong odors, and to their counteractants

Encephalograms show actual odor responses of brain, as . . .



Odor Specialists Get Down to Basics

The photographs above illustrate one of the latest techniques for exploring the science of odors, and how we react to them.

More than that, it may lead to a genuine understanding of the basic principles of "odor counteraction," a way of eliminating malodors that has been based, so far, largely on trial-and-error experimentation.

And perhaps most keenly interested in this work is Airkem, Inc. (New York), a 15-year-old specialties firm that has been built on this theory.* Airkem, now selling its formulations and equipment at a \$2 million/year rate, is now in the midst of a \$50,000 renovation of its laboratory and office building in New York. And though it hasn't cut back its empirical probe

for odor-counteracting combinations, there's no question that the use in odor research of encephalography—pioneered by a Mayo Clinic neurologist—may provide some of the strongest evidence that Airkem's color counteraction ideas are soundly based.

Atmosphere for Growth: Airkem already has practical evidence that its approach to odor control has merit—sales in '56 were a substantial 20% over those in '55. And while the household specialty Airwick still figures profitably in Airkem's business, its sales are now surpassed by sales of chemicals for industrial odor control, the area where Airkem feels it has the greatest growth potential.

The specialties business, of course, won't be slighted. The firm's now ready to go on a gel-form of its chemicals for use in automobile air conditioners. Airkem isn't forgetting that Airwick paid for its research program during many years.

Trial and Error: Current research takes about 7% of Airkem's sales dollar. Some of this goes for its own work on odor pairs. A 20-man staff headed by Claude D'Angio has evaluated by trial-and-error some 1,000 neutralizing combinations of scents. Ammonia, for example, can be countered by ionone. Such research has produced over 100 commercial formulations.

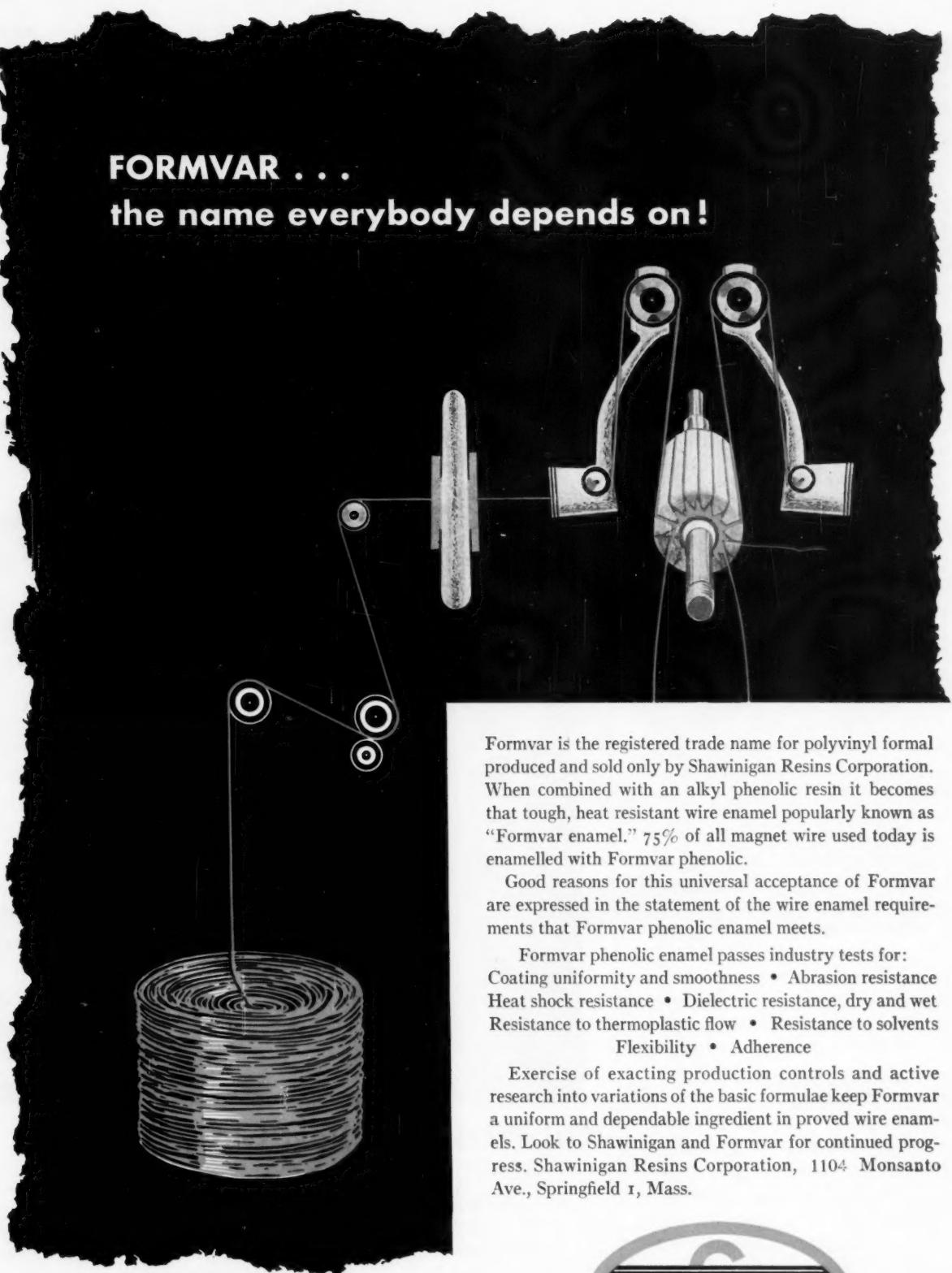
Two specific odor problems—countering the smell of petroleum refining, blotting out the stench of burning animal protein matter—are among the current problems this group is tackling.

In addition to the searching out of odor pairs, more fundamental research is supported. Airkem backs the work of the British scientist, Robert Moncrieff; Airkem, too, has worked closely with Dr. C. W. Sem-Jacobsen at the Minnesota clinic of the Mayos. Sem-Jacobsen devised the technique in which encephalograms are made by inserting electrodes of a recording de-

*Airkem credits the Flemish scientist Zwaardemaker with uncovering the phenomenon of odor counteraction in 1895. Very simply, the theory is that one odor—good or bad—will balance out another odor, leaving virtually no perceptible odor. For years, Zwaardemaker's work went unnoticed.

FORMVAR . . .

the name everybody depends on!



Formvar is the registered trade name for polyvinyl formal produced and sold only by Shawinigan Resins Corporation. When combined with an alkyl phenolic resin it becomes that tough, heat resistant wire enamel popularly known as "Formvar enamel." 75% of all magnet wire used today is enamelled with Formvar phenolic.

Good reasons for this universal acceptance of Formvar are expressed in the statement of the wire enamel requirements that Formvar phenolic enamel meets.

Formvar phenolic enamel passes industry tests for: Coating uniformity and smoothness • Abrasion resistance Heat shock resistance • Dielectric resistance, dry and wet Resistance to thermoplastic flow • Resistance to solvents Flexibility • Adherence

Exercise of exacting production controls and active research into variations of the basic formulae keep Formvar a uniform and dependable ingredient in proved wire enamels. Look to Shawinigan and Formvar for continued progress. Shawinigan Resins Corporation, 1104 Monsanto Ave., Springfield 1, Mass.

FORMVAR® for wire enamels by



SPECIALTIES

CHLORINATED PRODUCTS?

DIAMOND CAN SUPPLY THEM

Newark, N. J.

—that's where DIAMOND makes these chlorinated products. And we're equipped to give prompt attention to orders of any size.

Chloral
2, 4-Dichlorophenol
2, 4, 5-Trichlorophenol
2, 4, 6-Trichlorophenol
Hexachlorobenzene

Diamond sales representatives

(there's one located near you) will be glad to discuss production of other chlorinated products on a custom basis. Perhaps benzene sulfonylchlorides, or their chlorinated derivatives would interest you?

More Diamond products:

carbon tetrachloride; perchloroethylene; methylene chloride; methyl chloride; chloroform; Chlorowax® (chlorinated paraffin); muriatic acid; DDT; BHC, 15% and 40% gamma; Lindane; 2,4-D and 2,4,5-T amine salts, esters and formulations; grain fumigants.

Like more information or technical help?

Simply call your nearby DIAMOND representative. Or write DIAMOND ALKALI COMPANY, 300 Union Commerce Building, Cleveland 14, Ohio.



**Diamond
Chemicals**

vice directly into the olfactory lobes of the human brain. The subject is then exposed to various odors.

Such encephalograms vary in pattern with each individual odor. Airkem is now studying the procedure to learn if the wave pattern that results when one odor is cancelled by another is like the wave pattern of a brain lobe unstimulated by any odor. But the delicacy of the operation, the uncertainties of contacting the olfactory lobe, and limited number of test candidates makes progress slow.

Principles on the Job: In utilizing the discoveries of its research, Airkem has become one of the largest consumers of essential oils—consuming

over 250 tons of such chemicals each year.

The firm sells its products through three branches, Airwick, Airkem, and Airwick Overseas.

The domestic branch, with about 100 employees, has three plants—two in New York and one in Chicago. It handles liquid and aerosol Airwick products, made according to the firm's still-secret formula, and packaged by Seeman Bros., a New York grocery chain.

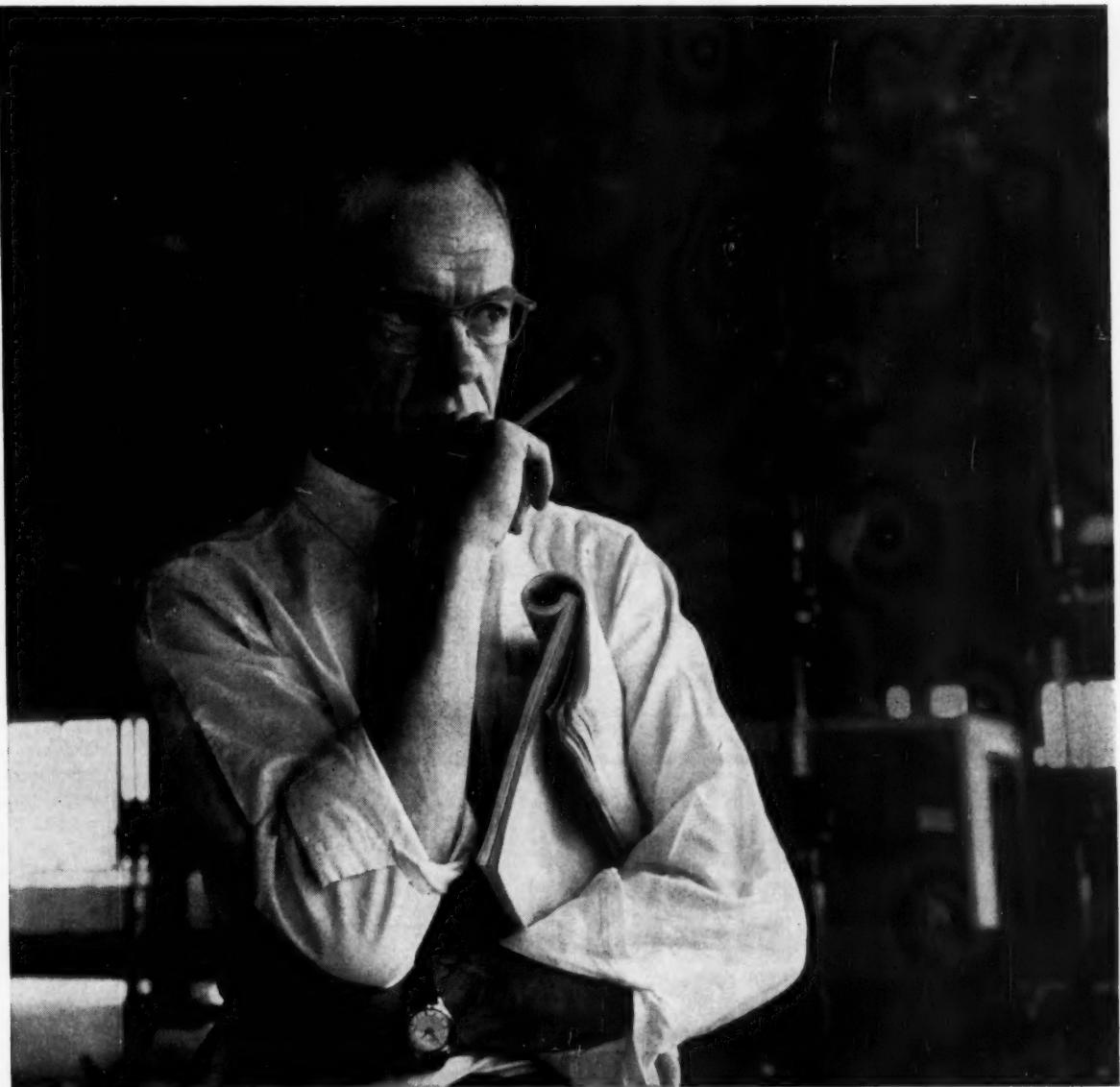
It also has a commercial section with 45 offices, five added in the last year. Among the key services offered are:

- Smoke odor control (deodorizing merchandise that has acquired an un-



Oil Producers' Past Glory

Candlemaking, once an attractive profit-maker for many companies, is no longer the industry it was 160 years ago—or even 60 years ago, when Standard Oil Co. of Indiana went into it. This month, Standard sold its business to Candle-Lite Inc., (Cincinnati). With the departure of the last oil company from candlemaking, the \$20 million market (55% religious, 35% homes and museums—such as Colonial Williamsburg (*above*) — as well as 10% miscellaneous) is now spread thinly among some 100 manufacturers.



Hard man to stick on a gum problem

(He's armed with Methocel and years of technical experience)

"Trouble shooters" might well describe certain Dow technicians. Give them a gum problem, and watch them shoot holes in it.

Their ammunition: Methocel® (Dow methylcellulose)—the water-soluble synthetic gum with never-varying quality.

Nine viscosity types and three grades offer a selection greater than any other gum—natural or synthetic. It's this broad range, coupled with their experience, that

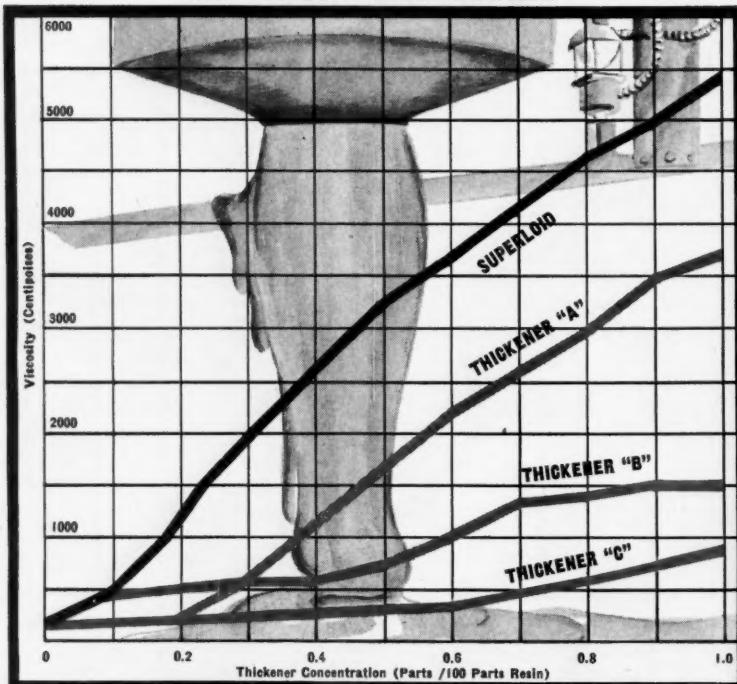
make these experts hard men to stick on a gum problem.

Fact is, they have helped solve problems on all types of products . . . from seed stickers, paint, paper, and pharmaceuticals to shampoo. Often, the product is but a futuristic gleam. Or the manufacturer is merely looking for a better gum. But whether it's a present product or tomorrow's, our customers agree: It pays to have Dow technicians working for you, today. **THE DOW CHEMICAL COMPANY**, Midland, Mich., Dept. BD 837A.

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This remarkably effective thickening agent produces desirable body and substantially improves working properties of latex and resin preparations. A highly efficient binder and stabilizer, Superloid prevents water separation and holds filler ingredients in improved suspensions. Especially effective for maintaining stability of dilute latex systems!

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Superloid measurably improves processing in such diverse applications as: bodying of resin and latex adhesives for better working properties and improved spread; conditioning of latex

for fabric backing applications; imparting desirable body and workability to latices for paper and textile sizings and coatings; and in other latex and resin applications for thickening, bodying, stabilizing, bonding and suspending.

If your latex or resin process or processing requires a thickening agent and stabilizer, Superloid may well test most efficient for your application.

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SPECIALTIES

pleasant smoky odor from store fires).

- Industrial odor control (counteracting malodors produced by operating kraft paper mills, sewage plants, and the like).

- Product odor control (making unpleasant-smelling products more acceptable).

A consultation service, formulating help, and space odor control are additional services.

Overseas, both the industrial and retail operations are handled by Airkem, Inc., and its subsidiaries. There are three major non-U.S. enterprises—in Canada, England, and France. These do the manufacturing of the products distributed in 63 countries.

Many of the 250 stockholders in Airkem work for the firm. The Wheeler brothers, William H., and Irwin, retain 51% of the stock; W. H. directs the domestic enterprises from New York, while Irwin takes care of the overseas operation from London offices.

Both here and abroad, Airkem has competition from other firms that produce aromatic chemicals which can be used to mask the bad odors of processes and products and make them more acceptable to the public. But odor control by counteraction has been pretty much Airkem's idea, and it is continually finding new ways to put its theories to profitable use.

NEW PRODUCTS

Deposit Deposor: Bishop Products (Stamford, Conn.) is now marketing a tablet-form coffee stain remover. The product, packed 18 tablets in a cardboard tube and priced at \$1, is called Koffee Kleen and is a detergent combination intended for use in removing rancid oils from coffee pots. Tablets are dropped in hot water which is boiled 15 minutes in the coffee making appliance.

Chlorofluorocarbon Grease: Halocarbon Products Corp. (Hackensack, N.J.) has just introduced a new chlorofluorocarbon grease, a blend of low molecular weight polymers of chlorotrifluoroethylene. The product, Halocarbon's grease series 25-10, contains no silica, soap, or other non-halogen thickeners, and has shown good promise as a lubricant for plug-cocks at oxygen plants, and in other corrosive services.



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You'll never get a wrong number when you use TITANOX—that is, in your line of plastic products.

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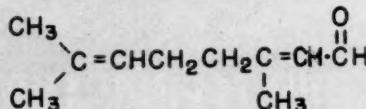
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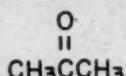
RESEARCH

NEW ROUTE TO CAROTENOID FOOD COLORS

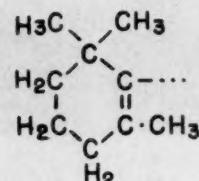
The present process starts with the complex aldehyde, citral...



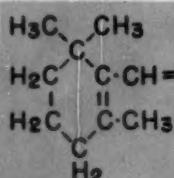
The new process starts with a simple raw material, acetone...



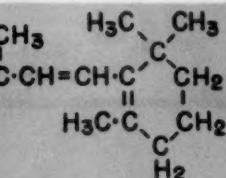
To make the β -Ionone group...



Which is converted to β -Carotene, other carotenoids



β -Carotene



Slick New Synthesis Sparks a Color Scramble

This week, synthetic replicas of certain natural food colors, made by the unique scheme depicted above, are trickling from a new, multimillion-dollar Hoffman-La Roche plant in Nutley, N. J.

By April, the firm hopes, the trickle will become a torrent. But the plant's eventual output hinges on considerably more than the technological success of the process it utilizes.

Demand for its products—some never before commercially available—depends on such still-to-be determined factors as cost, Food and Drug Administration acceptance, and adaptability to a broad range of food-coloring applications.

Behind this gamble lies a keen piece of chemical research by Hoffman-La Roche's (Switzerland) Otto Isler, already internationally prominent for his synthesis of pure crystals of Vitamin A.

(Continued on p. 68)



HOFFMAN-LA ROCHE'S ISLER:
His synthesis shortcut opens brighter
prospects for the carotenoids.

SULPHUR

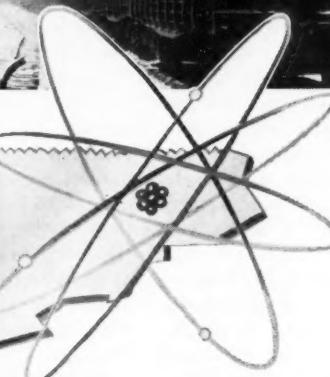
helps to create
headline products



URANIUM

Chloride Leaching
Chloride Leaching
Chloride Leaching
Chloride Leaching

Chloride Leaching
Chloride Leaching
Chloride Leaching



Ore milling specialists have settled upon acid leaching as the most practical and economical way to extract uranium values from ore concentrates. And as with so many other ore-leaching processes, sulphuric acid appears to be the best of the solvents, considering costs and availability.

So chalk up another 'headline' end-use for this most widely used of all acids! But this very broadening demand for sulphur emphasizes the problem facing producers of the basic element SULPHUR. Search for new commercial sources goes on without let-up all over the world. This company is playing a leading role in this search.



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The new food colors are potential competition for these coal-tar-derived dyes:

FD & C Name	Common Name
Red No. 1	Ponceau 3R
Red No. 2	Amaranth
Red No. 3	Erythrosine
Red No. 4	Ponceau SX
Red No. 32*	Oil Red XO*
Yellow No. 1	Naphthol Yellow S
Yellow No. 2	Naphthol Yellow S K-Salt
Yellow No. 3	Yellow AB
Yellow No. 4	Yellow OB
Yellow No. 5	Tartrazine
Yellow No. 6	Sunset Yellow FCF

* Recently decertified except for use in oranges.

In 1953, Isler synthesized β -carotene* from citral, obtained from lemongrass oil. This is the conventional commercial process. His new process starts with acetone, eliminates the need for lemongrass oil and thereby does away with a perennial raw-material-supply problem. Lemongrass oil output is tied to the vagaries of crop yields.

Two factors underlie expectations of less costly carotenoids: acetone is cheaper than lemongrass oil (\$1.50-4/lb.); and—perhaps more important—the new synthesis requires fewer steps than its predecessor. Material costs are overshadowed by production costs in making high-priced (about \$182/lb.) crystalline β -carotene.

Red and Yellow: Carotenoid food colors the company is now looking at for commercial possibilities include lycopene (the red coloring in tomatoes), zeaxanthin (yellow corn), physalien (a yellow found in flowering plants), and canthaxanthin (a yellow-orange in edible mushrooms). While none of these has been made commercially, lycopene has been made in a pilot plant using β -ionone (from lemongrass oil) as the precursor.

*A precursor of vitamin A occurring naturally in plants (e.g., carrots, sweet potatoes, alfalfa, clover) and animal tissue. Carotene is an orange-yellow pigment used in coloring and enriching margarine and in pharmaceuticals. Carotenoids are pigments occurring widely in vegetable oils and in some animal fats, range in color from yellow to deep red. Crystalline solids, they are soluble in fats and oils, insoluble in water.

But before any of these find a commercial future as coloring agents in edible foods, it will be necessary to overcome the limited solubility and stability of the compounds in water. Hoffman La Roche has cleared this hurdle by experimentally preparing β -carotene in a water-dispersible form. Formerly limited to use in fat-containing foods, β -carotene may now find its way into fruit juices, beverages, etc.

And that raises the possibility that much the same can be done for the other carotenoids.

Aromatic Dividends: Besides carotenoids, Isler's process can turn out perfume agents—e.g., ionones, linalools, irones, geraniols—which find ready markets in soaps, detergents, and cosmetics. Now obtained from natural sources (e.g., linalool is made from rosewood distillate), these aromatics can be made in purer form, synthetically. Hoffman-La Roche expects the synthetics to be priced at the same level as presently available forms.

The versatility of the process is one reason why it's still too soon to peg product costs. The firm's technical director, G. F. Siemers, says: "The syntheses involved in making all the possible compounds are so interrelated that production cost of any one compound is profoundly influenced by the production volume of the others."

Meanwhile, the carotenoid food colors are running into competition

from coal-tar synthetics (see table, left). β -carotene, for instance, is jockeying for position against FD & C*** Yellow 3 & 4 (both oil-soluble) which, at \$3.30/lb., cost 1/50 as much as the former. But β -carotene has Vitamin-A activity, is already the choice, for coloring such foods as margarine. Here cost is considered negligible in view of the final cost of the item. (Also, the nutritional benefits of vitamin A can be stressed in advertising.) FD & C Oranges 1 and 2, previously used as cheese colors, have been recently de-certified and the yellows may be in for a similar fate (*CW, Technology Newsletter, Jan. 12*).

Also finding use as food colors, although to a limited extent, are pigments extracted from natural sources—e.g., leaves, seeds. Annatto, for example, is a yellow vegetable dyestuff that contains the pigment, bixin. It's extracted from the seeds of plants found in South America and the West Indies. Primary use of annatto is in coloring dairy products.

Two drawbacks limit the use of extracted natural food colors:

1. narrow color range;
2. relatively high cost due to expensive processing.

But a number of companies are doing research in this field in an effort to overcome these obstacles to commercial use. Chas. Pfizer (Brooklyn, N.Y.), for one, reports that it has extracted new orange pigments from beans, hopes to develop a market for these promising newcomers.

Key Ruling: Much of the argument for use of the carotenoids in food coloring is that they are chemically, physiologically, and biochemically identical to their equivalent natural colors. For this reason, some argue, there should be no need for their certification by the Food and Drug Administration. But so far the FDA has made no ruling on β -carotene, the one member of the group that is in commercial use.

And there's the possibility that the FDA may decide that synthetic carotenoids fall under the same rulings that govern other synthetic food colors. That would be a real setback for the newcomers. It would become

*** The designation FD & C identifies colors permitted for use in foods, drugs and cosmetics. It differentiates such colors from the D & C colors that are permitted only in drugs and cosmetics (by the Food and Drug Administration), and external D & C colors for drugs and cosmetics that are applied externally.

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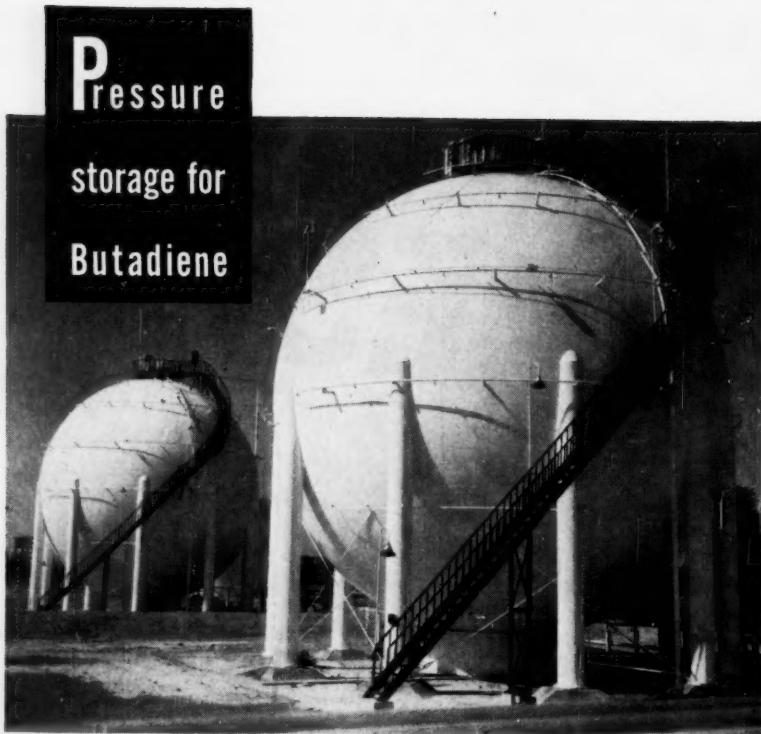
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Both Hortonspheres were pickled and painted by the Horton Pickling Process to remove mill scale and provide a better bond between surface and paint.

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RESEARCH

necessary to carry out exhaustive screening tests to demonstrate the carotenoids' safety—a lengthy, expensive procedure.

That's because carcinogenicity studies are, of necessity, long-term projects that embrace observations made over a considerable portion of the life-span of the test animal. And it's held that even the most exhaustive animal experiments do not provide conclusive proof of a compound's potential cancer hazard to humans.

Recognizing this fact, the FDA has sought advice on the design of such studies from experts in the field, particularly research groups at the National Cancer Institute and National Institutes of Health (Bethesda, Md.)

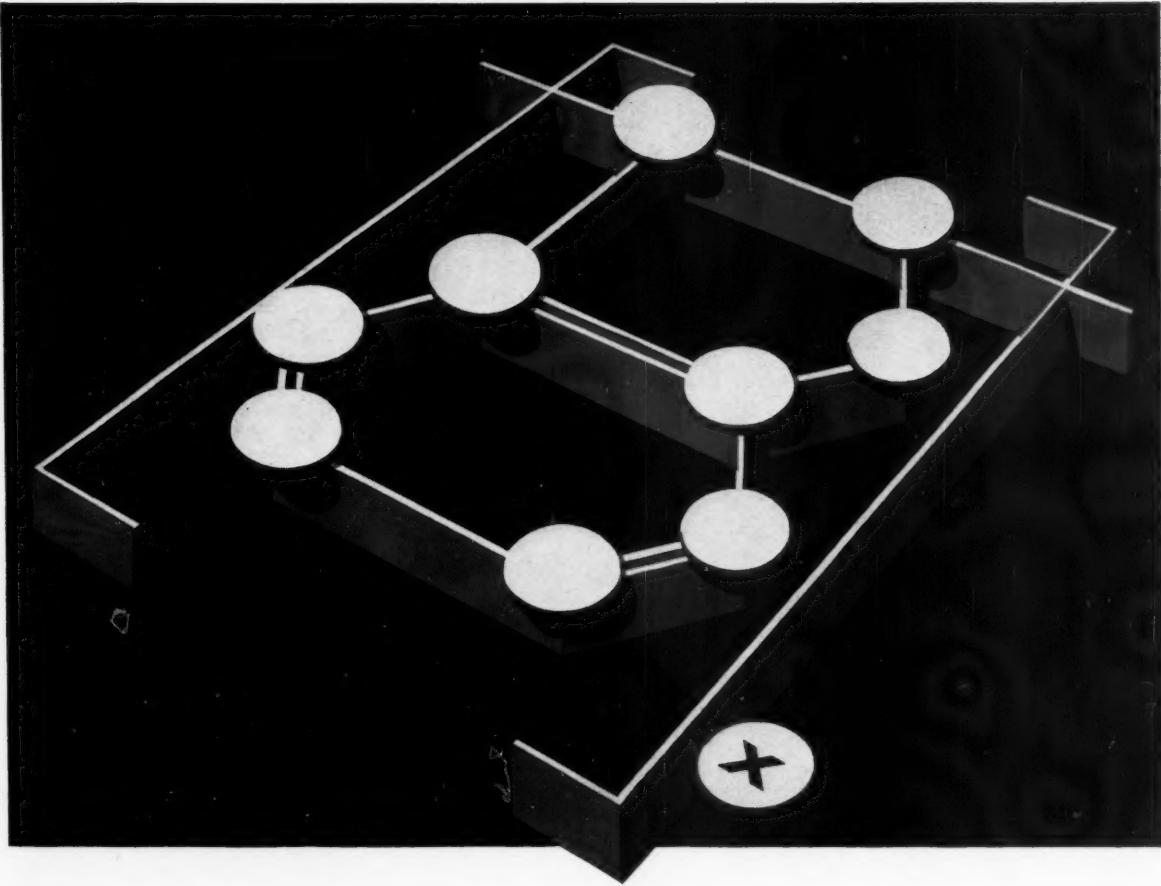
The test plan devised by these groups utilizes studies made on rats, mice and dogs. Rats are utilized in groups of 100 at each dosage level; mice (of two cancer-susceptible strains) in groups of 100 at each dosage level; and purebred dogs in groups of 5 at each dosage level. The dye is given to the animals in their feed. The rats and mice are to be maintained up to two years, the dogs for seven years.

Comparable groups of rats and mice are injected weekly with various quantities of the dye. Pathological studies are made on animals that die or are sacrificed during the study.

Even these relatively extensive studies are, in the opinion of leading medical and industry authorities, conservative in the light of our present knowledge. Moreover, they feel that non-FDA research groups are less likely to undertake studies of this kind on currently certifiable dyes than they are on dyes proposed for addition to the certifiable list. For this reason, they believe FDA is justified in undertaking such investigations.

That contingency is fraught with further complications. The FDA considers colors harmless only if they are innocuous in any ingested quantity. Certain coal-tar colors have been ruled out on this basis. Food-color manufacturers insist the word "harmless" should mean incapable of producing harm under normal conditions of actual use.

In any event, food-dye makers are hopeful that legislation will be enacted this year to clarify this controversial issue. The future of synthetic carotenoids may well hang in the balance.



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WOLCOTT (left), ZABOR: In cheaper polyethers, an edge on polyesters.

Polyether Boosters

As starting materials for polyurethane foams, polyesters and polyethers* are more than casual rivals. While polyesters have held an edge in cost, polyethers impart special properties sometimes desired by foam makers. This week, the polyether camp found new strength in the arrival of three compounds said to be lower in cost "in commercial quantities" than currently available polyesters.

In addition, foams made of the trio are said to show "virtually no change" in physical properties following accelerated humid aging tests specified by the Society for the Plastics Industry.

Developed by Wyandotte Chemical Corp. (Wyandotte, Mich.), the polyethers are named Pluronic polyol L61 and Tetronic polyols 701 and 904. They are high molecular weight (2-6,000) polyoxypropylene-polyoxyethylene block polymers terminating in primary hydroxyl groups. All three are members of Wyandotte's line of non-

ionic surface active agents covered by U.S. Patent 2,674,619 and patent applications.

While the resistance to humid aging of foams made with the newcomers comes as no surprise—polyesters hydrolyze, polyethers don't—the cost of the newcomers does. Wyandotte expects price to vary from member to member and for special grades, but pegs it at about 30¢/lb. in tankcar quantities.

It's hard to compare that with present polyether prices, which reflect small quantity production and vary all over the lot depending on what set of properties you want. But the best now on the market would probably cost about 75¢/lb.—if it were available in tankcar quantities. And—according to Wyandotte's Frank Wolcott, vice president, and general manager of its research and engineering division, and J. William Zabor, director of research—additional polyethers are under development. Their identity will be revealed within the next few months

* Each type of compound reacts with a diisocyanate to produce the foam.

upon completion of laboratory and field tests.

Wolcott and Zabor report that two major automobile producers already are using foam crash pads utilizing their polyurethane-grade polyethers; other applications are being studied. Both flexible and rigid polyurethane foams are prepared from their polyethers and toluene diisocyanate, they aver.

Polyurethane foam makers aren't likely to rush headlong to welcome new starting materials. They're well aware that large-scale foam production is often accompanied by problems not readily detected in pilot studies. But they're conscious, too, that stiffening competition from other foams (e.g., cellular rubber, cellular vinyl chloride) makes it good business to give the new polyethers a fair chance to make good.

Basic Opportunity

On receiving the coveted Perkin Medal of the American Section, Society of Chemical Industry last fortnight, the University of California's Glenn Seaborg cast an articulate vote for more basic research. What's more, he voiced his highly respected opinion on the sort of contribution industry can make.

Seaborg received the medal for his efforts in both basic and applied research—work that added eight new elements and many new processes to the applied chemistry of nuclear energy.

But he told the scientists and top executives assembled in his honor at New York's Waldorf-Astoria that—if the nation should double present expenditures for basic research—the American people would get the "greatest bargain . . . [they] . . . ever received for their money. . . . The return on over-all research spending would be way out of proportion to the small relative initial cost."

This extra emphasis on basic research, says Seaborg, should be made as soon as possible, because basic research is inextricably tied to national defense and because the whole national economy is rapidly becoming linked to continued technological advance.

Universities, by their very nature, will remain the natural center for basic research, he feels. In the past,

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sible?*

*Do you know that the advice
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RESEARCH

university budgets have generally favored fundamental studies.

They Also Serve: But even though universities must assume the biggest portion of the basic research burden, industry can't afford to overlook its responsibilities in supporting this work.

Rising research costs are causing more and more basic research to be supported by outside agencies, governmental and industrial. One result is red tape and delay in allotting funds for projects. Seaborg's suggestion to those contributing to these projects: give the universities lump sums for research, eliminate piecemeal disbursing of funds for small projects bearing specific titles.

Seaborg points out, too, that more money isn't the only answer to stepping up basic research benefits. More researchers, capable of creative thinking, are needed. It's squarely up to industry then to enhance the status of scientists, make careers in science just as attractive as careers in other professions.

Seaborg's method of distinguishing applied research from basic research is also worth consideration: "the motivation behind the research and the criteria that determine what work shall be undertaken and what changes made in lines of investigation as the study develops."

"In basic research," he declares, "the motivating force is not the attainment of utilitarian goals, but a search for a deeper understanding of the universe and of the living and inorganic phenomena within it. The key-note is intellectual curiosity."

EXPANSION

• Allied Chemical & Dye Corp. will include a textile research laboratory in its planned expansion at Bermuda Hundred, Va.

• Horizons Incorporated (Cleveland) is now making some of its research facilities available to industry on a service contract basis.

• Nopco Chemical Co. (Harrison, N.J.) has formed a new laboratory unit to evaluate new chemicals as vinyl stabilizers.

• Du Pont's Polychemicals Department will expand and modernize research facilities at the firm's experimental station near Wilmington, Del. A new laboratory wing will cost about \$1.5 million, is scheduled for completion by mid-1958.

• Industrial Cellulose Research Ltd., a subsidiary of Canadian International Paper Co. (Montreal), has launched a new department for basic research in cellulose.

• Vitro Laboratories has signed a contract for addition of a 20,000-sq.-ft. wing to its \$1.5-million laboratory under construction in Washington, D.C.

• Plans are under way to build a nuclear reactor at Bell Telephone Laboratories' Whippny, N.J., location. To be financed by the Air Force, the reactor will be used for research in electric, magnetic, and structural properties of solids, for studies of the effects of nuclear radiation on materials and components used in military electronic systems.

• Southwest Research Institute (San Antonio, Texas) has completed a new \$35,000 laboratory for research in the flammability of materials.

• American Cyanamid will set up an agricultural research center near Princeton, N.J., to study world livestock and crop problems under conditions paralleling those in the major agricultural nations.

• Atlantic Refining Co. is expanding research facilities at Dallas, Tex. Completion is expected by spring of this year.

• Endicott-Johnson Corp. is building a \$100,000 center at Binghamton, N.Y., for research in leather processing, other shoe industry operations.

• A reactor physics division has been set up at Battelle Institute (Columbus, O.) to conduct research in nuclear technology. Director: Joel Chastain, Jr.

• Dow Chemical is planning to build research facilities for several hundred staffers at a site in Contra Costa County, California.

• Parke, Davis & Co. (Detroit) plans to construct a new \$10-million medical research center on the north campus area of the University of Michigan (Ann Arbor). To be built on a 50-acre site purchased from the university, the project is expected to be completed by 1959.

• Borden Co.'s Chemical Division (New York) has established a forest products research group, part of the firm's Central Research Laboratory in Philadelphia. Immediate objective: to develop new resins and polymers for use in making improved end-products from wood.

34,000 registered
Nine-month operating data showed
natural gas liquids production of 101,000
refinery runs of 174,000 barrels a day; refin-
sales of 176,000 barrels daily, and completion of 174 net
wells, of which 146 were producers and 28 dry.

FLUOR CORPORATION AWARDED WYANDOTTE CHEMICAL CONTRACT

The Fluor Corporation, Ltd., Los Angeles engineering
and construction firm, has been awarded a contract by
Wyandotte Chemicals Corporation to design, engineer
and construct a large capacity electrolytic chlorine-caus-
site near Baton Rouge, La.

This 1200-acre site on the Mississippi River, where an
\$8,000,000 ethylene oxide plant is already under construc-
tion, has been named the Geismar Works. The new elec-
trolytic plant will require an investment of over \$20,-
000,000 and construction will begin in mid-1957, with
completion scheduled for the last half of 1958. The
Geismar facilities will increase by nearly 60% the total
caustic soda and chlorine capacity of Wyandotte
chemicals.

Other major projects under construction by Fluor in
the New York area include a gasoline plant at Eunice, but-
ton at Lake Charles, polymerization at Lake Charles, and
delayed coker at Lake Charles.

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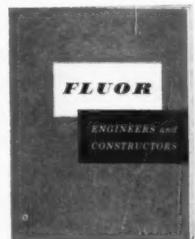
How to solve all of your expansion problems

Our clients know by experience that a Fluor bid is the shortest route to peace of mind. Trained to think in terms of the entire project rather than specific, isolated functions, Fluor people at every level have built a reputation for on-time completion...for keeping actual costs in line with estimates...for dependability of throughput and product quality...and for plants with low maintenance costs.

YOU GET THE MOST ADVANCED RESEARCH, ENGINEERING AND CONSTRUCTION TECHNIQUES... The extensive process knowledge and construction experience of the Fluor Corporation, Ltd. is supplemented by its affiliate, Singmaster & Breyer, Inc., process engineers for fine and heavy chem-

icals. Fluor also maintains exclusive agreements with several domestic and European firms, and is licensed to design and construct plants based on their processes.

When your plans call for expansion, ask our clients why they awarded their contracts to Fluor. In the meantime, why not get acquainted with Fluor's experience in your chemical field? Specific process information and photographs are waiting for your letter. Please write The Fluor Corporation, Ltd., 2500 South Atlantic Boulevard, Los Angeles 22, California.



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Whittier, California - Fluor of Canada, Ltd., Toronto - Singmaster & Breyer, Inc., New York City



ACID RESISTANCE

in phenolic and furfuryl-alcohol resins

It is possible through specific formulation and control to vary the physical and chemical properties of these resins within a considerable range, which makes them particularly versatile for many applications.

Resistance to alkalis as well as to acids is an example. For maximum resistance to chemical action, Durez furfuryl-alcohol resins are used. Corrosion-resistant cements and mortars based on these resins serve extensively for bonding acid-proof brick in tanks, vats, and floors of industrial plants. Combined with inert fillers such as silica and coke flour

and an acid accelerator, they set readily at room temperature.

These and other characteristics make Durez resins useful as impregnants, bonds, and laminating agents in a wide variety of applications. The phenolics, for example, provide desired properties in shell molds for metal casting, in boards and molded products made from wood particles, in rubber stocks and adhesives, in friction materials, liquid floor polishes, and other commercial products.

Let us help you with any problem that phenolic or furfuryl-alcohol resins may help to solve.



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DUREZ PLASTICS DIVISION

HOOKER ELECTROCHEMICAL COMPANY
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Export Agent: Omni Products Corp., 460 Fourth Avenue, New York 16, New York



RESEARCH

REPORTS

These new research reports are available from the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.:

- Mechanism of Linseed Oil Film Degradation Under Ultraviolet Irradiation (PB 121330) describes the chemical mechanism by which oil films deteriorate when exposed to ultraviolet light. Price: 50¢.

- Lubricants are treated in: PB 121531, Polyarylurea Greases (50¢); PB 121445, Foaming Characteristics of Aircraft Oils (50¢); PB 111919, Antiwear and Extreme Pressure Additives for greases (75¢).

- Research on high-temperature materials is covered in: Cemented Borides (PB 121346), \$3.50; Iron Bonded Titanium Carbide (PB 121-323), \$1.

- The results of recent nuclear investigations by the Naval Research Laboratory are described in: Operation of NRL-1 Carbon Steel Loop at the Materials Test Reactor (PB 121-319), 75¢; The Disordering of Polyatomic Solids by Neutrons (PB 121-202), 50¢.

- Progress on the development of a device for the nondestructive evaluation of structural adhesive bonds by ultrasonic techniques is covered in PB 121495, Development of Nondestructive Tests for Structural Adhesive Bonds, \$1.25.

- Also available: The Dielectric Properties and Molecular Structures of Certain Partially Fluorinated Esters (PB 121293), \$1; Reactions of Esters of Phosphorous Acid with Metallic Compounds (PB 121210), 75¢; The Oxidation of Activated Carbons at Room Temperature (PB 121411), 50¢; The Mechanism of Inhibitors for Chain Reactions (PB 121129), 50¢.

LICENSING

- Nonexclusive, nonassignable licenses allowing plastics processors to make, use, and sell vinyl plastisols containing monomer MG-1 (CW, April 7, p. 84) are now being offered by Union Carbide and Carbon Corp. through Carbide and Carbon Chemicals Co. The company also intends to make available to licensees the results of an extensive research program on vinyl plastisols. Plastisols based on MG-1 produce hard plastics that are expected to find major markets in such uses as flooring tiles, toys, and foams.

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ICC-APPROVED TIGHT-HEAD PAILS

Capacity 5 gallons. Made from heavy 24- or 26-gauge steel. Meets ICC specifications 17E and 37D. High-strength body available with straight sides or top and bottom beads. Drum top offset for easy stacking. Electric lap-weld side seam, and compound-lined, double-seamed head and bottom.

For full specifications on all Continental steel containers, contact your nearest Continental representative.

When you purchase steel containers, get the most for your money. This means the best in *service* as well as the best in pails and utility cans. At Continental, we go all out to give you what you're looking for—with our 4-star steel container service.

★ FULL LINE

Whatever product you're buying for, Continental has just the size and style container to fit it. Handi-Cans in 2½ and 5 gal. sizes, lug cover pails from 2 to 12 gal., flaring pails from 3½ to 6½ gal., plus 5 and 6 gal. tight-head pails.

★ QUALITY

Made of heavy-gauge steel in ultra-modern plants, Continental steel containers are thoroughly tested to meet ICC specifications and to conform to CFC/UFC Rule 40. Colorfully lithographed, these sturdy, reusable containers will continue to promote your product long after their original contents have been emptied.

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As part of our 4-star service, customer research men are available to help you right in your own plant. In addition, scientists at our Research and Development Center in Chicago are constantly working to bring you new and better packaging ideas—such as Continental's Perma-Linings for hard-to-hold products.

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Just say the word and we'll deliver all the steel containers you can use—any time, any place. Continental's excellent production facilities and carefully selected warehouse points in many sections of the country guarantee better service when and where you need it. So get full value from your purchasing dollar—with Continental's 4-star steel container service. Call anytime.

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USCOWELD PLASTIC PIPE FITTINGS

Greater Joint Strength—Faster Insertion—Thanks to THE ONLY SOLVENT-WELD FITTING WITH AN INTERFERENCE FIT!

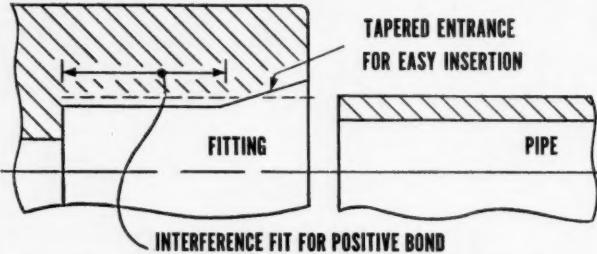
To get maximum joint strength, interference fit is a must! UscoWeld fittings are designed to provide at least a .005 inch *interference fit*. And UscoWeld fittings are a cinch to install because of a specially designed *tapered entrance socket*. U. S. Rubber has developed the unique UscoWeld fitting of the same tough, lightweight, corrosion-resistant thermoplastic as famous Uscolite® CP plastic pipe.

All UscoWeld fittings can safely handle the pressures recommended for the corresponding size of extra-heavy Uscolite pipe. Maximum recommended operating temperature is 170°F. Pipe can be cut to exact length, is easily installed in close quarters.

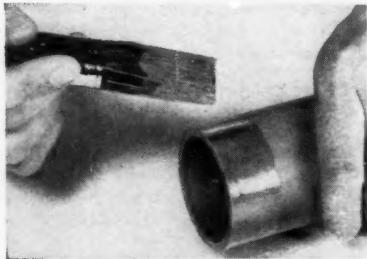
Obtainable at any of our 28 District Sales Offices, at selected distributors, or write us at Rockefeller Center, New York 20, N. Y.

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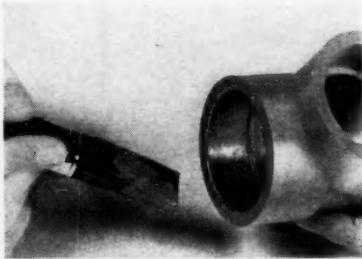
THE USCOWELD PRINCIPLE



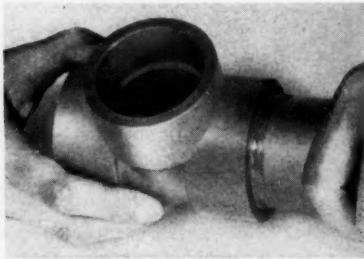
By combining tapered entrance socket and a .005 inch interference fit—even when the pipe is at the small limit of the diameter tolerance and the fitting at the large limit of its diameter tolerance—UscoWeld is easily installed, and the strongest solvent-weld joint available.



Apply Uscolite CP cement to the outside area of the pipe that is to be in contact with the socket.



Next apply cement uniformly to entire inside area of *tapered entrance socket*.



While both cemented surfaces are still wet, insert pipe in fitting and push until pipe bottoms against shoulder in the fitting.

ADVANTAGES

- fast, easy to assemble—tapered entrance provides easy insertion of pipe
- strong joint—interference fit provides for optimum fusion of pipe and fitting into homogeneous mass; joint strength not dependent on cement alone
- automatic alignment of pipe and fittings
- chemical resistance of the UscoWeld joint is the same as for Uscolite pipe

- UscoWeld takes maximum advantage of the inherent "solvent-weldability" of plastic pipe and fittings
- no threading required—just cut pipe square
- not necessary to allow for thread make-up variation—pipe can be cut to exact lengths
- easy to install in close quarters
- resists fatigue due to vibration or thermal stresses by elimination of stress concentration at thread roots.

Mechanical Goods Division



United States Rubber

Technology Newsletter

CHEMICAL WEEK
January 26, 1957

Strategic-Udy Metallurgical Processes, Ltd., started up its prototype ferromanganese plant in Niagara Falls, Ont., on schedule (*CW Technology Newsletter, Oct. 27, '56*). And the firm is going ahead with engineering plans for a \$15-million, 75,000-tons/year plant in New Brunswick.

At the formal dedication last week, Marvin Udy, inventor of the process, said that it is doing all he hoped it would and more. In essence, the high-temperature Udy process converts a low-grade ore into a suitable starting material for ferromanganese production.

The present ore contains about 11% manganese, 18% iron. Most of the iron is reduced to metal and dropped out; the manganese content is raised correspondingly. The hot molten slag that remains is converted, in novel electric furnaces, into either ferromanganese or ferromanganese silicon.

The plant has been in partial production almost four weeks. Udy originally estimated that about 7,000 kwh. would be needed to make a ton of ferromanganese. He now says that even less power is required. The high temperatures, he says, demand some further work on refractories. But he reports that no serious difficulties have been encountered on that score.

Udy says he can meet costs of present producers who use high-grade ores. And that doesn't include any credit for pig iron, which he pegs at \$70/ton of ferromanganese made.

He and other members of the firm are now looking beyond the present project to ferrochrome, treatment of high-iron bauxite, titaniferous ores, etc.

Pfizer has just been granted a patent (2,776,927) on the production of prednisone or prednisolone by fermentation with a *Protaminobacter* organism. Heretofore, Schering has been the name most closely associated with the two anti-arthritis. Schering, in fact, has licensed several steroid manufacturers on the basis of its patent applications.

Schering says the Pfizer patent covers a process "using only one of many organisms that can be used in manufacturing prednisolone and prednisone." It feels that the patent does not cover the products themselves nor their uses, and will not affect the licenses it has granted.

Recent Australians experiments have shown that titanium disulfide in finely powdered form may be a good lubricant. It performed better than either graphite or molybdenum sulfides, especially at high temperatures.

Technology

Newsletter

(Continued)

The chemical was found to be stable and effective at temperatures over 1000 C. And even under highly corrosive conditions, it was stable up to 300 C. Although the trisulfide is not as stable as the disulfide, it, too, proved superior to graphite and molybdenum sulfides in the Australian tests.

A discovery that radically alters ideas on atomic structure was reported last week by Columbia University, participant in recent joint studies that disprove the "parity principle"—a fundamental theory that has been accepted for more than 30 years. Studies were conducted by a team of physicists from Columbia and the Princeton Institute for Advanced Study.

Experiments at the Bureau of Standards' low-temperature labs showed that disintegrating nuclei of radioactive cobalt-60 gave off particles in a definite orientation instead of the random pattern predicted by the parity theory. Other tests produced similar decay patterns from the decay of subatomic "pi" mesons.

And new insight into the atomic architecture of crystalline materials is forthcoming via a neutron-diffraction technique developed at Westinghouse Electric Corp.'s (Pittsburgh) materials engineering department. Significance: neutrons can reveal the crystal structure of thousands of materials—particularly organic compounds and magnetic crystals—that do not lend themselves to analysis by X-ray diffraction.

Westinghouse's contribution is an improved method of making the neutrons "visible" to photographic film, shortening exposure time to as little as 1% of the time previously required.

Watch for renewed interest in absorption refrigeration systems (as opposed to compression systems). One manufacturer is now readying experimental models—scheduled for test-marketing this summer—of air conditioners based on this principle. Glycol ethers are among the chemicals that could be used as solvent for the refrigerant.

A new electric power station in Italy offers a fine example of chemical processing conservation. The plant, at Larderello, is getting steam from a volcano. This is passed through dry boxes to remove carbon dioxide and hydrogen sulfide. The sulfide is reduced to elemental sulfur with iron oxide. And the sulfur is extracted with carbon disulfide. The station generates 260,000 kw.; about 30 tons of sulfur are recovered daily.

Need technical help? The National Research Council is finding that the list of Hungarian refugees entering this country contains a surprisingly large number of biochemists, food technologists, others with scientific or medical training. More information may be obtained from the National Research Council, c/o The President's Commission, Old Post Headquarters, Bldg. 1306, Camp Kilmer, N. J.



Dust a problem in your material handling?

Here's how Michigan Tractor Shovels help Swift & Company

Swift & Company's plant food division at Madison, Wisconsin has the usual problem encountered in the processing of raw materials such as potash and superphosphate, and in handling the finished plant foods.

Equipment used in these processes is exposed to long hours of continuous maneuvering while handling the bulk materials. Equipment must be durable

to withstand the heavy loads, quick stops, and grit of raw material acting on the machine. Swift officials report the one-yard 77 hp Michigan Model 75B shown has given excellent results in meeting these requirements.

Works round-the-clock

"It is dependable," says Madison Assistant Superintendent Harry Peeler. "It worked round-the-clock during our latest two-month rush season. Its only stops were to add fuel, inspect oil, and change operators. We've had no troubles with grit in the power-train . . . and no axle failures."

Ken Kremelling, veteran tractor shovel operator, says, "Michigan's torque converter helps you heap big loads fast. Low bucket-carry helps you keep what you load. Power steer takes



Moving potash 110 ft from bin to mixer, Michigan is timed delivering 60 loads (67,200 lbs) per hour. Unit changes direction and speed at flick of power-shift lever. No clutching needed.

you around turns fast. And power shift helps you start back for the next load fast."

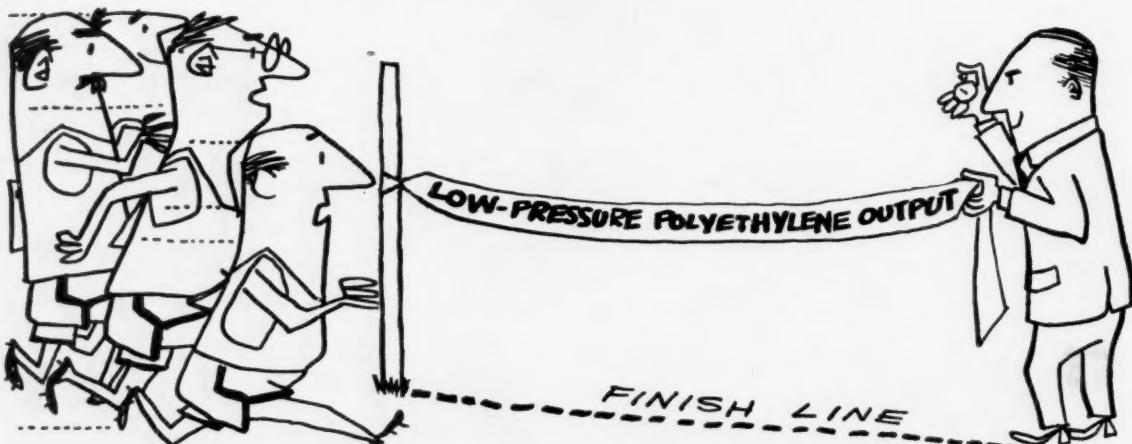
See Michigan advantages for yourself

A trial in your plant will show you how these same advantages can pay off for you. Write for details on the size Michigan that interests you—6, 10, 15, 20 or 27 cubic feet; 1, 1½, 1¾ or 2½ cubic yards.

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**CLARK
EQUIPMENT**

MARKETS



SPRINTING FOR COMMERCIAL PRODUCTION IN '57: The field is crowded and fast.

Low-Pressure "Poly" Race Nears Finish

The big rush is on. Before the year is out, a half-dozen low-pressure polyethylene plants will make their debuts, and producers' campaigns for outlets will hit full stride. Plastic makers and fabricators will, at last, learn to what extent the much-heralded plastic will eventually encroach on the markets of its now well-established big brother—high-pressure polyethylene.

There's an air of excitement rippling through the industry as producers push completion of plants and trade observers speculate on who will be first with commercial-scale production. But the race merely adds color to the scene because most near-ready plants will come onstream soon enough to share in the initial big splash that low-pressure "poly" is expected to make.

Too, it's sometimes difficult to know what a producer means by his on-stream date. It may, for example, signify the time the first dribble of plastic emerges from the unit. Full-capacity output, on the other hand, may not become reality until months later, when final bugs are ironed out of the process and the proper type and quality of product can be made consistently.

In any case, this is how the line-up looks now:

Focus on Texas: The activities of Phillips and Celanese at Pasadena,

Tex., have probably attracted more attention than other low-pressure polyethylene projects. The Phillips plant is by far the largest yet planned or constructed, will produce 110 million lbs./yr. when operating at full capacity.

Phillips broke the tape first by starting low-pressure polyethylene production during Christmas week, made its first salable product on December 31.

But Celanese will soon make its move. Parts of the equipment are now being warmed up, and the entire plant will be operating by late next week, should be producing marketable material shortly thereafter. Capacity of the plant: 40 million lbs./yr.

Union Carbide and Carbon is readying a plant at Seadrift, Tex., and another at Institute, W. Va. Both units are the same size—about 30 million lbs./yr. capacity. Onstream date for the Texas plant is sometime in the third quarter of '57; the Institute unit will be ready sooner, is now scheduled for the second quarter.

And in the East, Hercules Powder will complete a 30 million lbs./yr. plant (at Parlin, N.J.) in the first half of this year—probably in the second quarter.

Koppers has two installations on the way. Its 30 million lbs./yr. plant at Woodbridge, N.J., will be ready

in either the second or third quarter of '57; the Koppers-Brea joint venture at Wilmington, Calif., involves a plant of twice the size—about 60 million lbs./yr. capacity. Guesses are that it won't be completed until late '57—perhaps not until early '58.

Start-up time for Polymer Chemicals' (Grace) 50 million lbs./yr. plant at Baton Rouge, La., also is uncertain, will probably be sometime in the second half of this year.

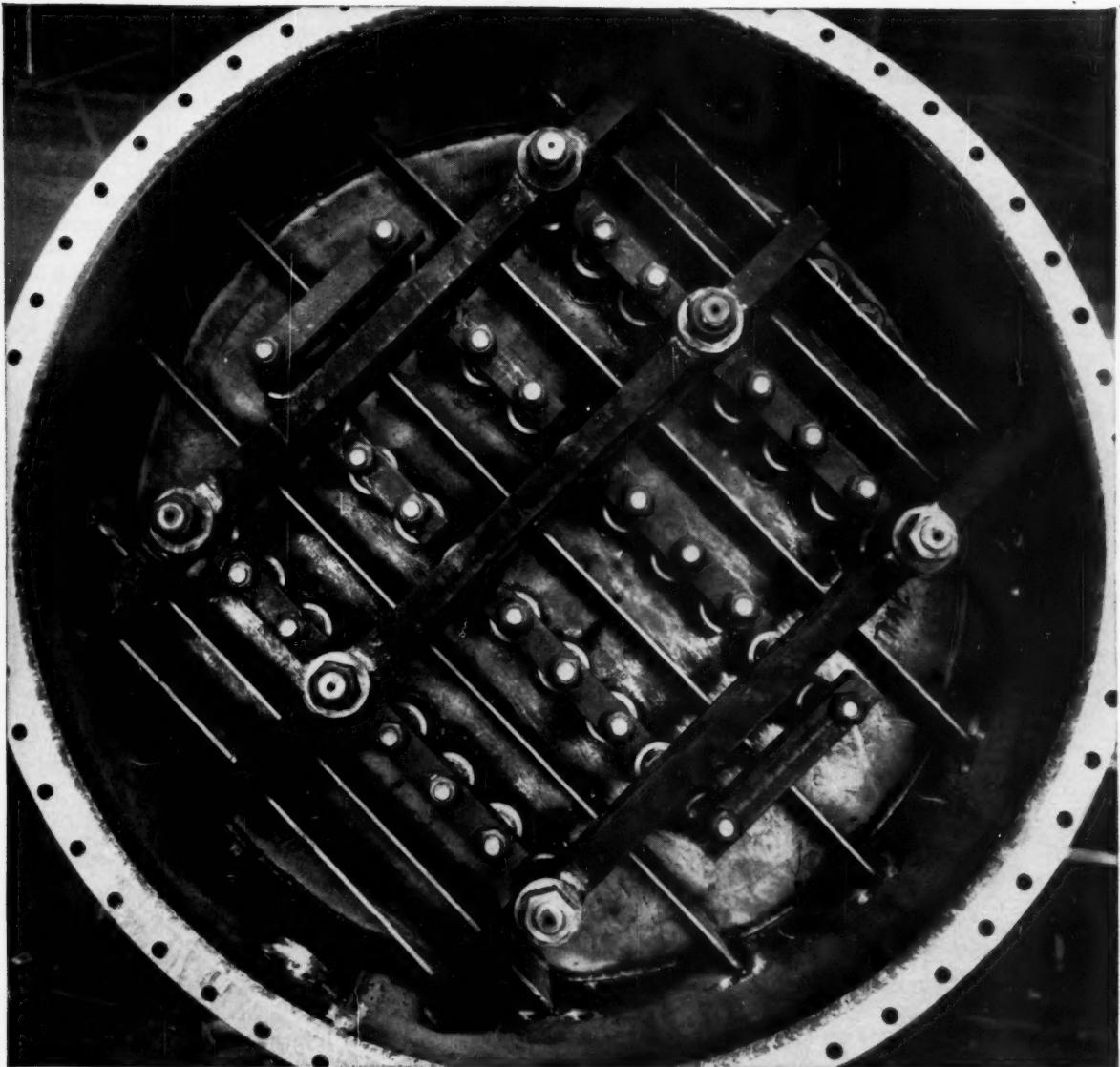
And Later On . . . Sometime before 1960 several more firms will join the list of low-pressure polyethylene producers.

Spencer, for example, has already been making pilot-plant quantities at Orange, Tex.; and Texas Eastman now has a semi-commercial size experimental plant under construction at Longview, Tex. Neither firm, however, is expected to be in full commercial production before '59.

Little is known about Goodrich-Gulf's plans except that a plant will probably be built before 1960—perhaps as soon as '58.

M. W. Kellogg may be on the low-pressure polyethylene scene within a couple of years. Although there's no official information about the size of the plant, *CW*'s estimate (Feb. 25, '56, p. 98) is 25-30 million lbs./yr.

Dow and Monsanto, too, are working on low-pressure polyethylene proc-



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MARKETS

esses, but when or how much capacity is forthcoming for each hasn't been revealed.

High and Low: How does the total U. S. low-pressure polyethylene capacity compare with that for high-pressure material? Some 380 million lbs./yr. of the former will be on-stream by the end of '57 or early in '58; by 1960, this may well increase to a near 600 million lbs./yr. —even if each potential producer which so far has not announced a plant size builds no more than a 30-million-lbs./yr. unit (the smallest size yet planned or constructed).

By comparison, some 300 million lbs./yr. of high-pressure polyethylene capacity, to be completed by mid '58, will boost the total for this material to between 850- and 900-million lbs./yr.

Hence the assured total polyethylene capacity by 1960 is about 1.3 billion lbs./yr., with low-pressure material accounting for 30% of the

total. If the estimated potential 600 million lbs./yr. of low-pressure capacity is realized within the next three years, the total U.S. polyethylene capacity by '60 will be close to 1.5 billion lbs./yr., with low-pressure material accounting for some 46% of the total.

Market Conflict? One big question bandied about by plastics experts is this: just how much will low-pressure polyethylene compete with the high-pressure material? Chances are, however, that it will be at least another year before this question can properly be answered. One reason: only a relatively small proportion—some marketers say not more than 7%—of total "poly" output this year will consist of the low-pressure material.

Some estimates—based on what is now known about the properties of each type of polyethylene—point to a probable end-use overlap of about 20%; but once fabricators learn to work with low-pressure material, this

estimate may change materially—one way or the other.

There are other complications in the polyethylene market picture in the offing. For one, high-pressure equipment can be used to make higher than usual density materials, whose uses will presumably overlap applications of regular high- and low-pressure materials.

(High-pressure polyethylene has a density range of 0.914-0.923; the new intermediate density materials range from about 0.930 to 0.940; and the low-pressure types, from 0.945 to 0.960. The physical properties of any given type of polyethylene depend, of course, on the density of the material. For example, low density materials excel in flexibility and impact resistance, whereas high density types have better heat resistance, stiffness, clarity, tensile strength. Thus the high density polyethylenes will be particularly suitable for articles that must withstand sterilization temperatures; they also will be very important in molding uses—in fact, it's in this market area that strong competition is expected to develop between low and high-pressure polyethylenes.)

Another factor in the future competitive picture is polypropylene, although its impact is still some years off (*CW*, June 16, '56, p. 79). Just as there still is considerable conjecture about the coming competitive effects of low-pressure "poly" on high-pressure material, it's even more difficult, now, to fit polypropylene into the picture. Perhaps the most that can be said at this point is that the latter's impact will bear more directly on low- rather than high-pressure polyethylene.

How do producers of high-pressure polyethylene view the handwriting on the wall? Apparently not without trepidations.

Rather than emphasize differences between the various types, it's said, plastics marketers should think in terms of polyethylene per se. Why? Each new type that's added to the broadening spectrum of polyethylene materials will find its own uses, and will, in fact, enhance the importance of the polyethylene family as a whole.

Obviously, the answers will be found in the marketplace; and some of them will begin to take shape this year.

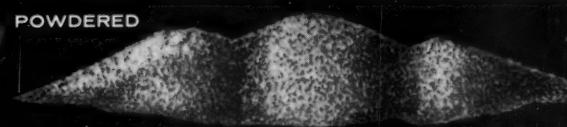
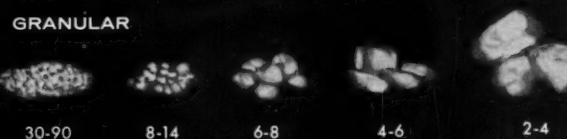
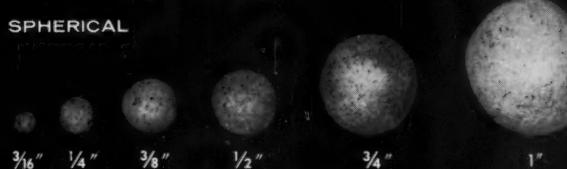


Polyethylene Helps Make a Pond

Man-made ponds—for temporary storage of water and other liquids—are providing giant-sized outlets for high-pressure polyethylene film.

Developed by Dowell, Inc., the pond-making technique has already been applied to storage of water in dry-area engineering operations; the 8-feet-deep bulldozed pit (*above*), measuring 55 by 75 feet, is lined with 8,000 square feet of polyethylene film that cost \$400. (The 0.003-inch-thick film is available in sizes up to 80 by 4,000 feet.

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Nickel Sulfate	Sodium Methoxide
Nickel Nitrate	
Zinc Nitrate	

Our experienced technical staff will assist you in developing the best and most economical catalyst. If you have a catalytic process in the development or production stage, a discussion with us may prove beneficial.



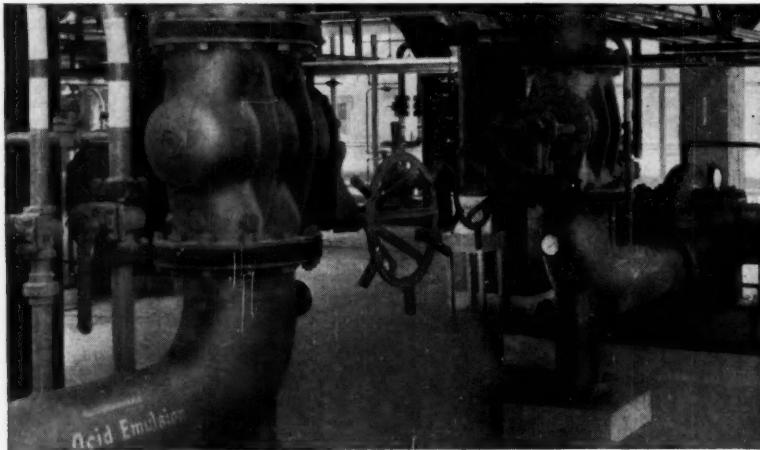
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cost, longer life. Rockwell-Nordstrom valves are available in a complete range of sizes for wrench, gear, or power operation. And they cost no more, often less, than ordinary valves. Available in a full range of sizes and pressure ratings. Write for complete information.

ROCKWELL MANUFACTURING COMPANY
PITTSBURGH 8, PA.

MARKETS

Sulfite Dampener

The year just ended, in terms of sales, was more than heartening to most segments of the chemical process industries. But for at least one portion of the pulp and paper business—that dealing with the distribution of spent sulfite liquor as a roadbinder material—'56 fell short of anticipation. Wisconsin pulp mills, according to the Lake States Roadbinder Association, last year sold some 55.5 million gals. as against 62.4 million distributed in '55.

The 11% decrease, says the Association, is the first annual sales loss registered since the sulfite-pulping industry started using the by-product as a roadbinder material more than 10 years ago. (It had previously been dumped as waste into the state's streams.)

Sole reason for the '56 reversal: unfavorable weather decreased the number of days on which the roadbinder could be advantageously applied to gravel roads, says Jaro Holý, the group's technical chief. Last spring, nine mills with active roadbinder programs estimated that their '56 volume would be close to 75 million gals., up 20% over the previous year. Plant and hauling capacity were expanded accordingly, and, as it turns out, needlessly.

But this year may be different. Predicts Holý: "Utilization of sulfite roadbinder in '57 should substantially exceed last spring's optimistic estimates. If next summer does not again rain our tank trucks off the roads, sulfite roadbinder will resume its upward trend.

German Resin Gain

German polymer production during '56 registered some significant gains over the previous year. Latest figures out of Bonn indicate total resin output hit about 500,000 tons, valued at DM 1.4 billion, compared with '55's DM 1.2 billion.

Imports increased about 33%, while exports amounted to about 17% of resin production. By October '56 polymer output (PVC, polyethylene, polystyrene, and polymethacrylates) was up 22%—to 200,000 tons. Condensation-polymer production (polyurethane, polyesters) increased to 162,000 tons, and cellulose plastics jumped 20% to about 50,000 tons.

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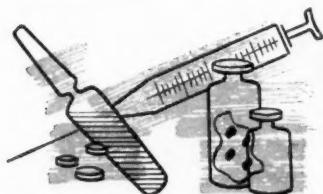
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"CO₂ applications are unlimited" . . . a broad statement, but literally true. New ways in which this most versatile of all gases is improving products, cutting costs and saving time and labor are being developed almost daily. Some of the applications discussed here will be of direct, primary interest to you. Other uses, while perhaps not in your immediate specialty, may well be adaptable to your field. Check the box by each application on which you'd like detailed, technical data and mail to:

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Your inquiry will receive prompt, professional attention from the chemical applications staff of the world's largest producer of CO₂.



► **Economical, Efficient "Freeze-Drying"**—Freeze-drying is used to dehydrate heat sensitive substances at low temperatures. In the processing of blood plasma and the manufacture of penicillin, streptomycin and other pharmaceuticals, dry ice or liquid CO₂ is used to freeze the item being dried. Also, during the drying stage, dry ice is used to condense the moisture as it is sublimed under vacuum. Capable of quickly attaining and maintaining the extreme low temperatures required, CO₂ has the added advantage of requiring only a small capital outlay.

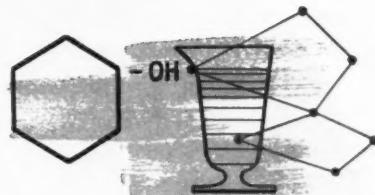


► **Precipitation of Carbonates**—Carbon dioxide in its gaseous form is used to

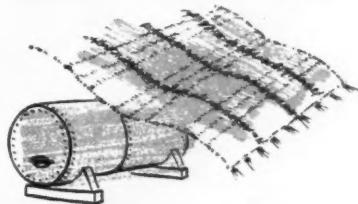
precipitate carbonates from water solutions. Ammonium bicarbonate and lead carbonate are examples. Bakeries and plastics manufacturers are among the many users of ammonium bicarbonate.



► **Simplifies Pulverizing of Materials With Low Melting Point**—Many substances tend to melt or smear because of the heat generated in a milling process. DDT and vegetable fat flakes which are waxy and Teflon resin which is very tough and elastic are examples. In the low temperature pulverizing process the ingredient is mixed with crushed dry ice or low pressure carbon dioxide liquid is injected directly into the ingredient. These methods effectively inhibit the melting or smearing, prevents plugging and reduces horse power requirements. Gaseous carbon dioxide is also used to form an atmospheric "blanket" to effectively prevent fire during the grinding of flammable materials. An example of this application is the grinding of phosphorus pentasulphide and flammable resin materials.



► **Fireproof "Blanket" For Stored Phenol**—Phenol is a toxic, corrosive, flammable compound and is stored in an inert atmosphere under slight pressure to reduce vaporization, prevent oxidation and at the same time provide a non-flammable atmosphere. Carbon dioxide is also used as a pressure medium in transferring liquid phenol.



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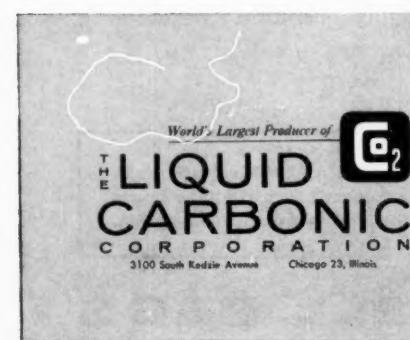
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user
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through
specifications
review

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(2) The new Specifications book enabled the customer to order bags more easily and accurately. It also simplified his inventory control.

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Market Newsletter

CHEMICAL WEEK

January 26, 1957

The flurry of price changes that whipped through the nation's marketplace with the advent of the first quarter has apparently subsided. This past week, for instance, was notably devoid of any broadly significant alterations.

Next week, though, some tall-oil consumers in the paint, varnish, soap, and linoleum industries will be handed increases ranging from \$5-10/ton (tank-car quantities). First to post the higher "effective Feb. 1" schedule is Union Bag-Camp Paper Corp., and chances are most other tall-oil producers will make similar moves.

Depending on grade, the company's tank-car prices will range from \$110 to \$125/ton. C.l. and l.c.l. amounts will also be advanced on an f.o.b.-plant basis.

Last week's note concerning the 2¢/lb. cut in tricresyl phosphate prices (*CW Market Newsletter, Jan. 19*) is the tip-off to the current acutely competitive nature of the plasticizer market. Further substantiation: the persistent reports in the trade that official quotes of some phthalates are being shaded. Sales of di-octyl phthalate, for example, generally are being made at prices at least $\frac{1}{2}$ ¢/lb. less than the 28¢/lb. (tanks) being carried on most manufacturers' price lists.

The plasticizer situation today, say some observers, is similar to that prevailing last fall when official schedules were finally revised downward to realistically reflect actual market prices. Phthalate sales are being maintained at fair levels at the moment, but oversupply and competition may dictate another industry-wide list change—perhaps this week.

At least one major penicillin and streptomycin maker is revising prices upward this week. Effective Monday, Pfizer's potassium and procaine penicillin (non-sterile forms) were each advanced $1\frac{1}{2}$ ¢/million units, establishing a $6\frac{3}{4}$ ¢/million units price. Sterile forms now cost 7¢/million units, up from a previous $5\frac{1}{2}$ ¢.

Streptomycin sulfate tags are being increased by 1¢/gram, will cost consumers $8\frac{1}{2}$ ¢/gram.

Prices on finished dosages and feed supplements containing these antibiotics haven't yet been lifted, but it's likely they soon will be proportionally raised.

Behind the increases, says Pfizer, are the same factors that have played hob with prices on many chemical items—higher costs for raw materials, labor, packaging. Certain conclusion: other penicillin and streptomycin makers, coping with identical pressures, will follow Pfizer's suit.

Market Newsletter

(Continued)

If there had been any doubt that the year just ended was a rip-roaring success for the U.S. aluminum industry, some revised reports out of the Aluminum Association do a good job of dispelling them.

Total primary production in '56 amounted to 3,358,861,859 lbs., 227 million lbs. more than the previous year's 3,131,439,251 lbs. All-time record month was July with 303,248,000 lbs., while the fourth quarter of '56 set a new high of 885,561,928 lbs. for the period.

British production and use of polyethylene (or "polythene," as it's called there) give no indication of abating. By '60, says the authoritative journal *British Plastics*, at least five British companies will be producing some 260 million lbs./year, "more than three times the present quantity."

News of negotiations between the New York Shipping Assn. and the International Longshoremen's Assn. has simmered down. But, insist close observers, don't take that to mean that a settlement is imminent. A strike injunction (granted under Taft-Hartley) expires Feb. 12, and then the union could resume the stoppage that in November crippled movements through Eastern ports.

Another strike, though, would be a violation of the T-H law—if the National Labor Relations Board accepts an examiner's recommendations that the board bar the union from (1) demanding from shippers a contract that would cover all East and Gulf ports (coast-wide contract is one of ILA's key demands); (2) using economic pressure, such as a strike, to force the shippers to agree to any contract covering more than the Port of New York.

Behind the "coast-wide port" contention: shippers insist that a prior NLRB finding restricts their bargaining for more than New York; ILA wants the broader bargaining unit to help protect it against "raids" by other unions.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending January 21, 1957

	Change	New Price
UP		
Amyl acetate, dist. 125 to 150 C, dms., c.l., frt. alld.		
E. of Rockies	\$0.005	\$0.185
Aluminum stearate, dibasic, ctns., c.l.	0.02	0.39
Barium stearate, ctns., frt. alld.	0.02	0.41
Calcium stearate, ctns., c.l.	0.02	0.39
DOWN		
Tung oil, dms., c.l., N. Y.	\$0.0025	\$0.2425
Carnauba wax, #1 Ceara, yellow, bgs., ton lots	0.05	1.38
Di-octyl phthalate, tanks, frt. alld.	0.005	0.28

All prices per pound unless quantity is stated.

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IGEPAL CO-210	1%	23	Foam control, cosolvent.
IGEPAL CO-430	4	44	Emulsification, Chemical Intermediate.
IGEPAL CO-430	1	54	
IGEPAL CO-430	1-10	65	
IGEPAL CO-710	10-11	68	Detergency, wetting, emulsification, dispersion (use temperature determines choice of product).
IGEPAL CO-730	15	75	
IGEPAL CO-850	20	90	Stabilization of latices and emulsions. General purpose surfactants for concentrated electrolyte solutions.
IGEPAL CO-880	30	96	

^aMoles of ethylene oxide per mole of nonylphenol.

^bMoles of ethylene oxide.

Further application information, literature and technical assistance on IGEPAL CO surfactants available upon request.

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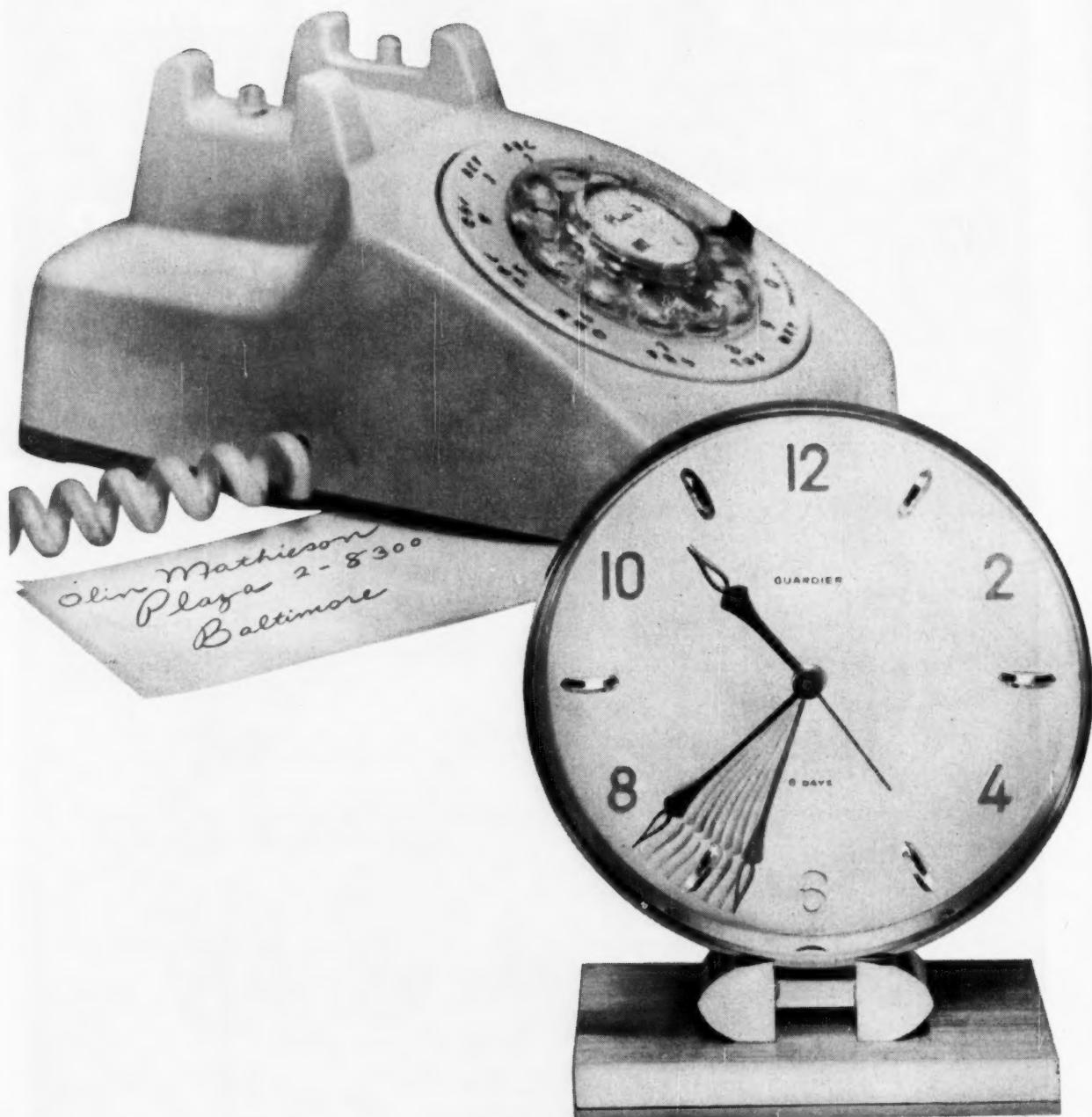
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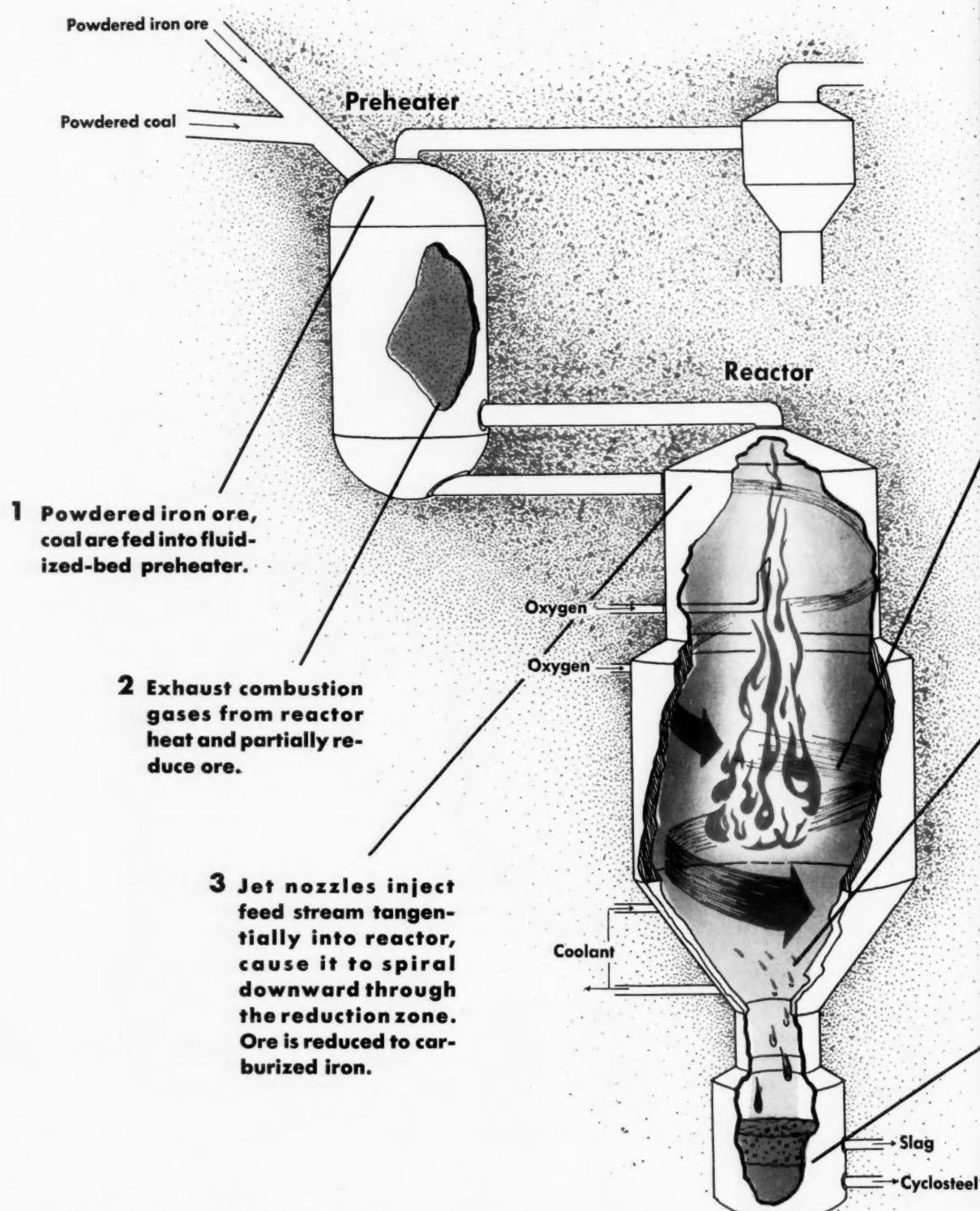


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4783

PRODUCTION

Cyclone Reactor:



In Goes Ore—Out Comes Steel

4 In burning zone, combustion with controlled addition of oxygen converts carburized iron into steel, supplies heat to reduction zone and preheater.

5 Increased rotational speed causes molten steel and slag particles to agglomerize, fall out of whirling stream.

6 Cyclosteel settles to bottom of hearth. Slag floats on top.

THE high-speed whirling reactor stream shown at the left is the chemical engineering answer to a steel man's dream. It's the heart of the British-developed Cyclosteel process that telescopes the entire steel-making procedure into one step. By making steel directly from the ore, the process bypasses the coke oven, blast furnace and the open-hearth, electric furnace, or Bessemer converter

The method was cautiously revealed in a talk by Sir Charles Goodeve, director of the British Iron and Steel Institute, at last summer's meeting of the British Association for the Advancement of Science (*CW, Technology Newsletter*, Sept. 8, '56). The occasion was the 100th anniversary of Henry Bessemer's historical disclosure of his steelmaking process.

Typically conservative, the British have refused to say very much about the process, except that it has produced a form of crude steel.

But despite British reluctance to discuss the discovery, a lot can be deduced from Goodeve's paper, the patent literature (Australian Patent 16,801) and expert opinion in the U.S. steel industry.

Best of Both: Cyclosteel apparently combines features of two other European developments: the Swedish sponge-iron process and Austrian top-blowing.

The sponge-iron process uses carbon monoxide to reduce the iron ore at temperatures under 1,000 C to finely divided particles of iron. But it can't make low-carbon steel because impurities can't be separated out.

Top-blowing, on the other hand, shows the way to separation. To appreciate that fully, you have to consider this background: The development of tonnage oxygen processes gave great freedom to users of the Bessemer (or Thomas) converter. By enriching the air with oxygen (or by using pure oxygen diluted with steam or carbon dioxide), temperature and time may be controlled to suit the raw materials and end products. Nitrogen content of the steel, moreover, is reduced to a very low level and scrap steel can be used as feed. But the process goes so rapidly that it's impossible to take samples and make alterations in the formulas.

The Austrians found that by blowing jets of oxygen into the metal—from the top down instead of the other way—they could slow the process. More important, they found that the same technique greatly simplifies phosphorus removal, which means that phosphorus can be removed before, or along with, the carbon. That same principle—the removal of phosphorus and carbon impurities by hitting the stream with oxygen—is what makes Cyclosteel possible.

Fluidized Preheater: According to the Australian patent, these two processes are combined in this way to form a single continuous process: Ore is preheated in a fluidized-bed countercurrent or concurrent reactor using the hot gases from the combustion reaction in the Cyclosteel reactor. The fuel (e.g., powdered coal) may be preheated with the ore. A certain amount of ore reduction can be tolerated, but—to prevent agglomeration—must be kept to a minimum.

Gases leaving the preheater are cycloned to separate entrained particles. Then they may be re-introduced into the process as carrier

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PRODUCTION

gas for the powdered ore and fuel. And some may be bled off to a heat exchanger, to preheat oxygen going to the reactor.

The reactor is designed along lines similar to the British Coal Utilization Research Association's cyclone-sludging chamber used with closed-cycle coal-burning gas turbines. Jets introduce the powdered iron ore and coal tangentially, setting up cyclonic action. As the materials spiral downward, gases from the lower burning zone shoot up through the center and out the top. They have relatively little contact with the powdered materials, but heat them to 1300 C. The ore is reduced to carburized iron.

Oxygen is added to burn off carbon and phosphorus, convert the carburized iron to steel. By adjusting the amount of oxygen supplied, the carbon-content of the steel is controlled.

The reaction is highly exothermic, yields a burning-zone temperature of about 1600 C. A fine mist of molten steel and slag forms in the burning zone. After an initial widening to accommodate gases generated by the reaction, the reactor walls converge, thus speeding up the rotation of the swirling mist. Droplets agglomerate, fall out into a container or hearth where steel settles to the bottom, slag floats to the top.

The gases flowing up from the burning zone are supplied with additional oxygen in the reactor's reduction zone. This causes further combustion, which decreases the calorific value of the exit gases, increases the process's thermal efficiency. More important, it decreases the reducing power of these gases, allows them to be used for pre-heating the ore.

Designed for Flexibility: In actual practice, the simplicity of the process probably would be masked by a more complicated reactor design to better utilize process heat and reaction gases. Too, the basic Cyclosteel process can be adapted to suit any number of conditions and raw materials.

Most any grade of ore can be used—though sulfur impurities have caused trouble so far, and only low-sulfur ores are now used for experiments. And, phosphorus impurities have not been reduced to the desired level.

But proper temperature-time regulation and the addition of a flux like lime may lick this problem. Fluxes may be added with the ore to the pre-

heater, or at the agglomeration zone. Gaseous fuels may be substituted for coal, have the advantage of acting as the carrier gas. Air can take the place of oxygen, or a part of the oxygen (preheating must compensate for the cooling effect of nitrogen).

Formidable Scale-Up: The most formidable problem facing Cyclosteel development is finding materials of construction to withstand the high reaction temperatures. BISRA says the upper part of the reactor would be made of heat-insulated, abrasion-resistant material (temperatures: to 1300 in the reduction zone, to 1600 C in the combustion zone). The lower part is of cooled refractory—the cooling adjusted so that a partially solidified coating will protect the material from excessive wear.

Biggest aid to cutting temperatures might be operation under pressure (which BISRA says is possible).

Other Approaches: There's no assurance that the scale-up problems will be successfully solved. But there is no denying the interest in methods that bypass the blast furnace. For, although the blast furnace is a highly productive unit, the expense of building new ones and replacing old ones is tremendous. Then, too, they devour huge quantities of coke, require a large investment in coke ovens—and they tie steelmaking to coking-coal areas.

U.S. companies are looking closely at fluidized-bed processes that would convert the ore to sponge iron or pig. Hydrocarbon Research and Bethlehem Steel are exploring the H-iron process (*CW, Technology Newsletter, March 31, '56*). It subjects ore to hydrogen at 400 psi. and 900 F to produce a sponge iron.

Others have similar processes. But most are believed to operate at lower pressures and higher temperatures (1100-1700 F) that would require ores (e.g., ones from Venezuela) that will not get sticky in that range.

Those reported piloting or researching processes include: U.S. Steel, Arthur D. Little and Esso Research, Republic Steel, Jones & Laughlin, Armco, and Inland Steel.

The British are not saying that Cyclosteel is the answer. Nor are they saying it will work. But it has already attracted intense interest simply as a result of Sir Charles Goodeve's statement that "it has a good chance of coming off."



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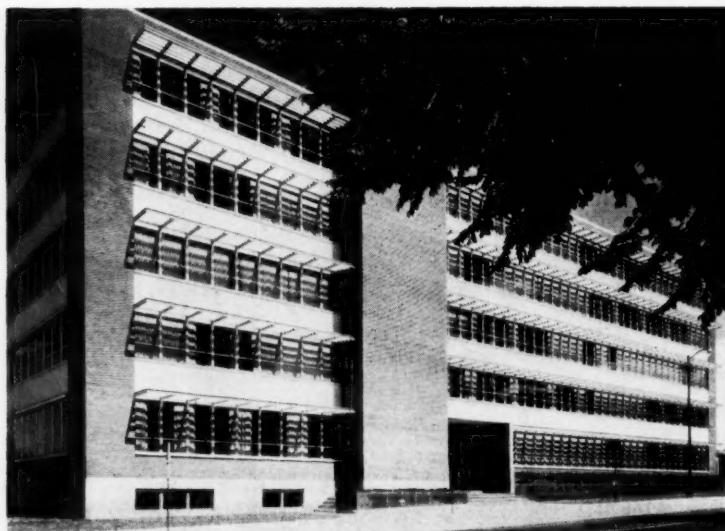
PRODUCTION



S-R PROJECT TEAM: In uranium ores and oil shale, plenty of room to grow.

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When the atomic energy and petroleum industries started dipping into the rich uranium ore and vast oil shale deposits in the West, Stearns-Roger Manufacturing Co. (Denver) grabbed the opportunity to cast its lot with the ever-expanding chemical process industry in the development of these new fields. Today the employee-owned engineering firm has several major chemical and uranium processing jobs among its current projects, last year topped its '55 record of \$50 million-plus in contracts. S-R's broad entries in the chemical field, says president Charles O. Voigt, have enabled the company to grow



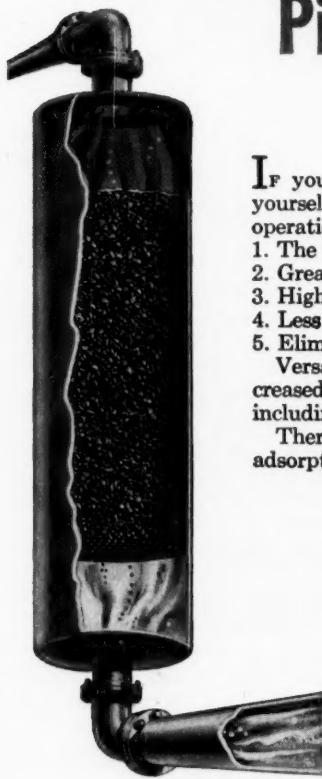
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PRODUCTION

as much in the past five years as it had during the previous 15.

Tops among the firm's brightest prospects, says Voigt, are the developments in atomic energy—both in production of atomic raw materials and in applications for atomic energy. Already more than a dozen S-R engineers are working full time on the use of atomic energy in electric generating plants, other strategic projects. Others are busy on the construction and planning of uranium processing and other nuclear production facilities. S-R recently completed a uranium mill at Tuba City, Ariz., is currently working on another at Medicine Hat, Utah.

Though shale oil recovery is still a long way from commercial operation, S-R has already achieved a ground-floor position in this field through its pilot investigation and equipment engineering work on two oil shale projects. One of these contracts calls for the construction of a 24-tons/day pilot plant to test the Aspeco process which Denver Research Institute is currently investigating (CW June 23, '56, p. 60) for Oil Shale Corp. (Los Angeles, Calif.).

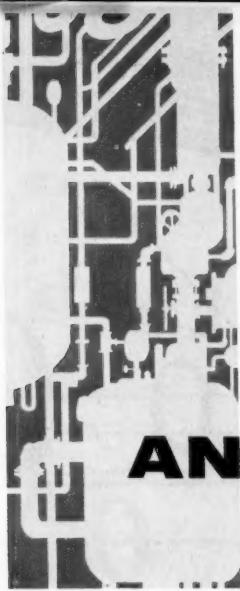
S-R's other contract on shale oil covers all phases—from pilot production to final construction—of a \$7-million plant for Union Oil Co. at Grand Valley, Colo. Union last week reported that pilot operation may get under way within 30 days.

But S-R isn't hanging all of its future hopes on new or unconventional processes. Since it first entered the field of major plant construction in 1908 with the installation of a beet-sugar mill at Garden City, Kan., the company has built up a considerable store of know-how in several types of processing:

- In potash production, S-R pioneered in the design and construction of new types of material handling equipment (one of its strong points), chemical concentration and product storage. Recently it installed an experimental plant employing an entirely new—and still undisclosed—method of making potash.

- In copper processing, S-R introduced new techniques and equipment that, it says, "made significant improvements" in ore concentration operations.

- For gas and oil processing and refining plants, S-R offers plant design,



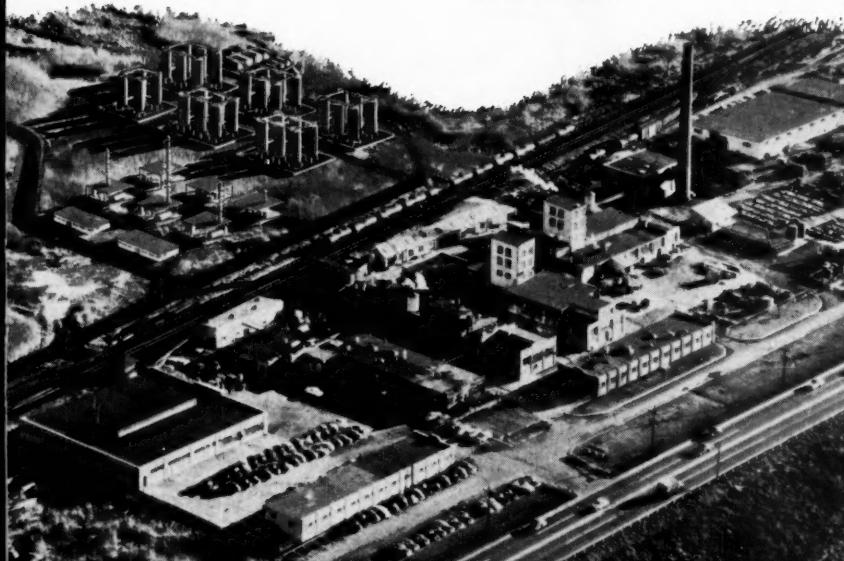
ANISIC ALDEHYDE

(Industrial grade)

The TRUBEK LABORATORIES Inc.

INTERMEDIATES DIVISION

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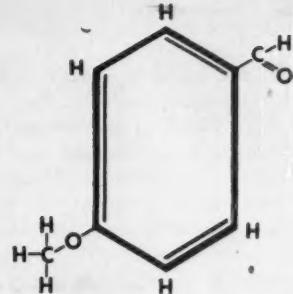
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The facilities and experience of Truland may be employed advantageously for the economical upgrading and disposal of solvent mixtures and organic by-products.

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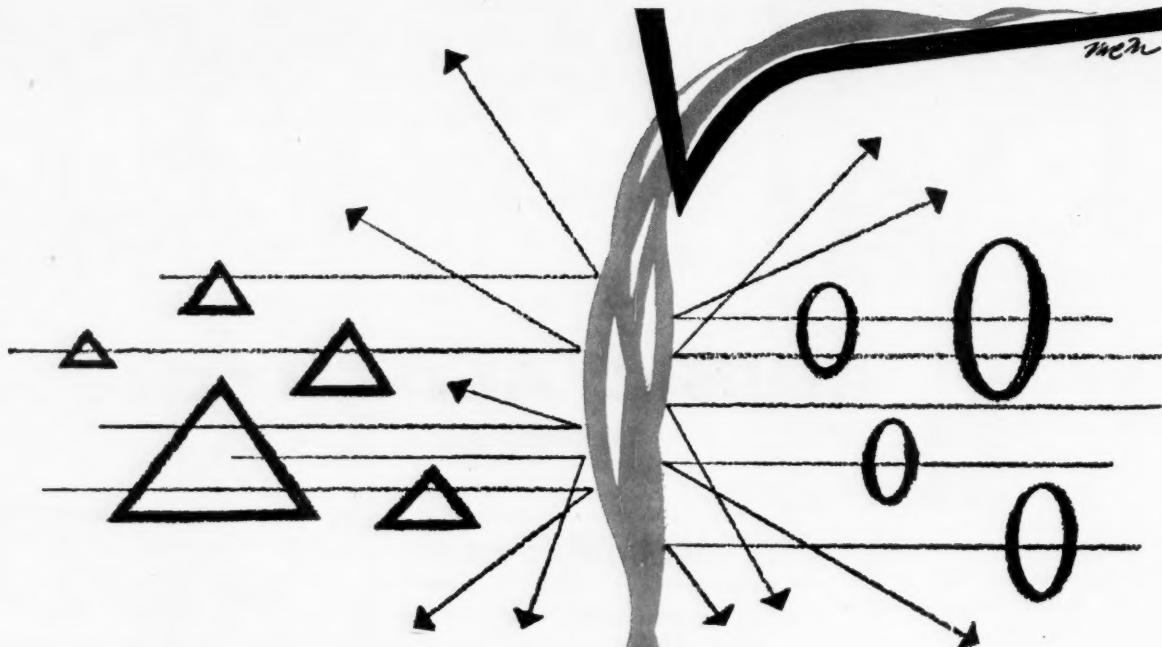
PARA METHOXY PHENYL ACETIC ACID



TRULAND

CHEMICAL CO., INC.
EAST RUTHERFORD
NEW JERSEY

Division of
**THE TRUBEK
LABORATORIES**
Incorporated



No oxidation, no rancidity—after a year and a half of storage! And during that time the sample (Neo-Fat® 94-04, Low Titer) was opened to the atmosphere every month for the first 6 months, every 3 months thereafter.

In the Mackey Test (which measures resistance to oxidation, based on the time required to reach 105°C), the swatch soaked in Armour Red Oil revealed no discoloration from oxidation after 5 hours 30 minutes. Yet, two swatches soaked with other well-known red oils charred and reached the point of internal combustion after 2 hours 5 minutes and 1 hour 5 minutes, respectively.

Depending on your needs for titer or color, Armour has other Oleic acids—Neo-Fats 94-10 (High Titer Red Oil) and 92-04 (Low Titer White Oleic).

Safeguard the stability of such products as soaps, cleaners, cosmetics and polishes. Always specify premium quality Armour Oleics!

SPECIFICATIONS (Neo-Fat 94-04, Low Titer Red Oil)

	Min.	Max.
Titer, °C.....	—	5
Iodine Value.....	—	95
Acid Value.....	197	202
UNSAPOONIFIABLE.....	—	1.0%
Moisture.....	—	0.4%
Color, Lovibond 1°.....	—	3R-15Y
Mackey Test.....	5 hrs.	—

Write today for an evaluation sample, the Armour Oleic Booklet and Technical Bulletin on Soaps and Esters.

Armour Chemical Division
1355 West 31st Street • Chicago 9, Illinois

Please send me: Sample of Neo-Fat 94-04.
 Armour Oleic Booklet.
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Resists Heat—Resists Oxygen

**TOUGH 18
MONTH TEST
PROVES
STARTLING
STABILITY
OF ARMOUR
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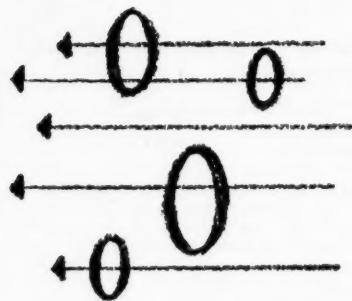
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Fatty Acid Derivatives
Industrial Oils

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Fractionation Produces...

HIGHEST PURITY FATTY ACIDS



Only Armour uses fractional distillation and solvent crystallization to produce a complete line of uniform fatty acids. These Neo-Fat® fatty acids are offered in single components in purities as high as 96%. Yet you pay no premium in price because Armour is basic in fat and oil raw materials. One of the Armour Neo-Fat Fatty Acids may be the chemical to help you produce a finer product at lower cost. Write us for samples and further information.

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PRESSED STEARIC ACIDS

Neo-Fat® 18-54 Double Pressed
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SPECIALTY COCO ACIDS

Neo-Fat 8 Commercially Pure Caprylic
10 Commercially Pure Capric
12 Commercially Pure Lauric
14 Commercially Pure Myristic
265 Double Distilled Coco
Plus tailored blends of coco fractions

SPECIALTY PALMITICS AND STEARIC ACID

Neo-Fat 16 Commercially Pure Palmitic
16-54 70% Palmitic
18 Commercially Pure Stearic
18-57 65% Stearic
18-58 70% Stearic
18-61 80% Stearic

PRODUCTION

engineering and construction (including vessel fabrication). It plugs its one-source service as the key to quick, efficient turnkey jobs.

The company also specializes in gas recovery, cement, and beet- and cane-sugar manufacturing facilities.

Emphasis on Men: If you were to look for the secret of S-R's success, you'd probably find it pretty well summed up in its attitude towards its personnel. "We stress that men come first," says Voigt. "Buildings and plants can be replaced, but not men."

In keeping with this philosophy, the company gives key personnel wide latitude in authority and responsibility, rewards individual initiative and exceptional service. This policy, the company feels, is the surest way to encourage continued progress. Adds Voigt, "We have too many fine, farsighted young men to ever think of restricting them in their thinking or planning."

One way of rewarding the outstanding contributions of its personnel is the S-R stock-ownership plan, under which the company is entirely owned by the employees. The stock made available to an employee is not fixed by a rigid formula; in each case, the amount is determined by the company's six veteran directors. More than 200 S-R employees hold S-R stock in varying amounts. Such intangibles, says Voigt, have been important in keeping our personnel satisfied.

In the past two years, the staff at S-R's \$2-million Denver headquarters has grown from 450 to more than 850; its field construction crews now number between 3,000 and 4,000.

CONSTRUCTION

Rapid Repair: A crash program to repair AEC's Paducah, Ky., plant, damaged two months ago by a \$2-million fire, has restored the vital facility to 80% operation. Malan Construction Corp. (New York) holds the contract for rebuilding the plant, has more than 300 men on the job. Reason for the rush: the gaseous diffusion plant, operated by Union Carbide Nuclear Co., produces uranium 235—vital to enriched nuclear fuels and atomic weapons.

Refining Boost: The recent completion of two Gulfining units at

Gulf Oil Corp.'s Port Arthur refinery adds 45,000-bbls./day. capacity for the production of high-quality home-heating fuel. The units were constructed by the M. W. Kellogg Co. (New York), employ a new Gulf-developed process in which oil is treated with byproduct hydrogen from catalytic reformers. Sulfur is removed as hydrogen sulfide in the Gulfining equipment, can later be recovered in other units as elemental sulfur.

Power Expansion: Copolymer Rubber and Chemical Corp. will install a \$3-million steam power-generating unit at its Baton Rouge, La., synthetic rubber plant under a program described as "a leveling of facilities for production purposes." The power addition will likely match the new requirements of a general 30% expansion program—begun last June—covering modifications or additions in every section of the plant.

EQUIPMENT

Urethane Aid: Dayton Rubber Co. (Dayton, O.) offers a nomograph for calculating costs of foamed-in-place urethane products. Foam weights and costs, says Dayton, can be determined from known data (foam volume and density, price of liquid component), regardless of raw material supplier.

Ultrasonics: Two new ultrasonic devices are available:

- D-52 Sonicell, claimed to be the largest immersion transducer now available, is offered by The General Ultrasonics Co. (Hartford, Conn.). The all-welded, stainless-steel transducer has 52 sq. in. of radiating area, can be coupled with other units for use in large tanks in cleaning, pickling and plating processes. Units operate at 20,000 cycles/second, are claimed to be unaffected by all known solvents.

- Vibro-Ceramics Division of Gulton Industries, Inc. (Metuchen, N.J.), offers a series of ultrasonic generators for driving a wide variety of low-impedance transducers in cleaning, chemical processing, soldering and drilling applications. Tagged Glennite U-405, generators are blower-cooled, have un-tuned output system featuring 500-watt RF-power output, operate at any frequency between 20 kc. and 2 mc. or at fixed frequency of 40 kc.

EMPLOYMENT OPPORTUNITIES

IN THE CHEMICAL PROCESSING INDUSTRIES

- **Displayed Rate**—\$38.00 per inch effective Jan. 1957. Frequency rates on request. Advertising inch measures $\frac{1}{8}$ inch vertically on 1 column. Subject to Agency Commission. 3 cols. to a page.
- **Closing Date**—Each Tuesday, 11 days prior to publication date.



- **Undisplayed Rate**—\$1.80 a line, minimum 3 lines. To figure advance payment, count 5 average words as a line. 10% discount if full payment made in advance for 4 consecutive insertions. Position wanted ads $\frac{1}{2}$ above rate.
- **Box Numbers** count as one additional line.

Send NEW ADS & INQUIRIES to Classified Adv. Div. of Chemical Week; P.O. Box 12, N.Y. 36, N.Y.

Chemical Market Analyst

Nationally known progressive chemical manufacturer in the fatty acid and derivatives field is in need of a Chemical Market Analyst. Must have chemistry or Ch.E. degree. Graduate work in marketing or economics desirable. Minimum experience of one to three years in the chemical marketing research area. This experience preferably should be in the area of market determination for new products rather than statistical analysis. The successful candidate will be responsible for determining markets for new chemical products. Chicago headquarters with some traveling involved. Send résumé of qualifications with salary history to:

J. F. Finnerty
Armour Chemical Division
1355 West 31st Street
Chicago 9, Illinois

Chemical Market Analyst

Progressive chemical manufacturer of fatty acids and derivatives is in need of a Chemical Market Analyst. Must have Chemistry of Ch. E. degree. Graduate work in marketing or economics desirable. Experience of one to three years in chemical marketing research also desirable. This experience should preferably be in the area of market determination for new products rather than statistical analysis. The successful candidate will be responsible for determining markets for new chemical products. Chicago headquarters, with some traveling involved. Send résumé of qualifications with past earnings to:

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1355 West 31st Street, Chicago 9, Illinois

SEE CHEMSTRAND'S AD on
Page 11 of THIS MAGAZINE

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(Chemical, Mechanical, Metallurgical, Textile, Industrial, Instrument and Civil) and

CHEMISTS

(Organic, Physical Analytical—Instrumental and Wet Method, Textile Chemists.)

Write to Technical Personnel Department

THE
CHEMSTRAND
CORPORATION
Decatur, Alabama

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B. S. or M. S. Organic Chemistry; technical sales-service and laboratory experience desired but applications from recent graduates and other interested men accepted. Duties include laboratory and field sales work associated with the sale of isocyanates and related products.

Excellent working and living conditions in congenial atmosphere where the contribution of an individual is recognized and rewarded.

Please send complete resume to:
RICHARD KITHIL, VICE PRESIDENT
THE CARWIN COMPANY
NORTH HAVEN, CONNECTICUT

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Development and formulation work

Some experience synthetic detergents and cleaning specialties. Excellent working conditions. Fine country location Connecticut shoreline, one hour from N. Y. Opportunity for independent creative work. Negotiations in strict confidence. Write fully under personal cover to C. L. WEIRICH, C. B. Doles Company, Westport, Conn.

Space Salesmen Wanted

We are looking for sales trainees to sell advertising space for CHEMICAL ENGINEERING or CHEMICAL WEEK. No selling experience necessary. Age requirement 21-30 years. Opportunities unlimited. Send complete résumé or phone for appointment. Contact Steven J. Shaw, Advertising Sales Manager, CHEMICAL ENGINEERING • CHEMICAL WEEK, McGraw-Hill Publishing Co., 330 W. 42nd St., New York 36, N. Y. Phone: LOngacre 4-3000. Ext. 693.

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To assume complete control and development of floor wax manufacturing. Must know emulsions thoroughly. Unexcelled opportunity with fast-growing Midwest chemical manufacturer. Excellent salary and large bonus paid currently with income.

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Large national corporation needs men under the age of 30, with a Bachelor degree in chemistry or chemical engineering, for position of chemical salesman. Upon completion of training in Chicago must be willing to relocate any part of the United States. Write giving complete résumé of family background, education, work experience (if any), and salary desired.

SW-4024 Chemical Week
520 N. Michigan Ave., Chicago 11, Ill.

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Graduate Mechanical Engineer with at least 10 years experience in Rayon Industry, preferably in staple, to take charge of Engineering Department. Scope of position covers maintenance, power, design and construction. Administrative ability required. Please send full resume and salary requirements to:

Hartford Rayon Company
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(Continued from opposite page)

RESIN CHEMIST

For research position with promising opportunities. Involves research on wide range of surface coating resins to be applied by newly-developed solventless technique. Desirable experience and education as follows: 3 to 5 years minimum experience in broad field of resins involving co-polymerization, catalysis and plasticization. Should have a B.S. in Chemistry or Chemical Engineering. Courses in polymer chemistry desirable but not necessary. P-3968—Chemical Week, Classified Adv. Dept., P. O. Box 12, New York 36, N. Y. describing in detail education and research experience in resin field.

Positions Vacant

Chemists, Technicians and Junior Chemists. We are a progressive, growing, well established non-defense organization and are enlarging our staff at all levels. If you have more than 2 years experience in any of the following, we would be interested in details of your education and in examining your resume: Protective organic coatings, paint vehicles, mineral fillers, mastics, adhesives or pigments. Indicate salary requirements. Pleasant surroundings. Eastern Middle Atlantic Manufacturer. P-4094, Chemical Week.

Chemist with national company manufacturing ball point writing compounds (inks), some experience in organic research desired. Pleasant working conditions in Southern California. Write full details, age, experience, education and salary requirements. P-4054, Chemical Week.

Positions Wanted

Plasticizers Product Manager fitted by previous experience to assume complete responsibility for development and production. PW-3973, Chemical Week.

Production Manager Graduate chemical engineer, experienced in manufacture of chemical specialties for textile industry, i.e., softeners, detergents, finishes; products for metal working industries and steel mills. Familiar at plant management level for 20 years with all phases of medium-sized chemical plant operation. PW-3958, Chemical Week.

Chemical Executive: S.B.Chem.Eng.M.I.T. 35 years experience all phases organic chemical industry including production sales, foreign distribution, new product development, and management. Fully qualified for assignment at executive level. Manhattan headquarters preferred. PW-4075, Chemical Week.

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Naturally, you are anxious to secure the most suitable man or men available. You want men with the special training that will make them an asset to your organization. You can contact such men through an advertisement in this Employment Opportunities Section of CHEMICAL WEEK.

Classified Advertising Division

CHEMICAL WEEK

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SENSITIVITY .001 MG
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EQUIPPED WITH MECHANICAL FRACTION LOADER RANGE 10 to 1210 MG
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HAnover 2-6970

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Used to maintain uniform viscosity.
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2 TANKS
National Board • DIW
Working Pressure 300 lbs.
T. —300°F—Liquid • 650°F—Gas
Mfg. in 1943
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Pfaudler Glass Lined Jacketed and Agitated Kettles, 30 gal. to 300 gal. capacity, Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

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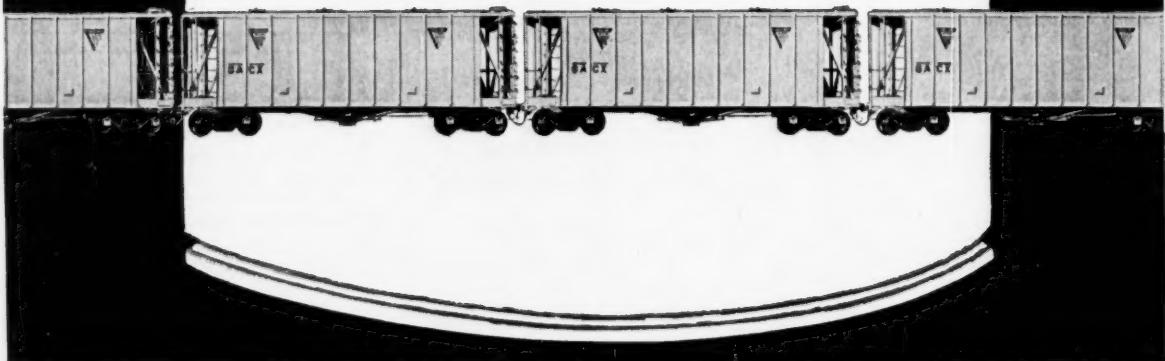
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when you need professional assistance in solving difficult problems. Their specialized knowledge and broad experience can prove invaluable in saving both time and money for you.

CHEMICAL WEEK invites other consultants to list the special services they offer on these pages.

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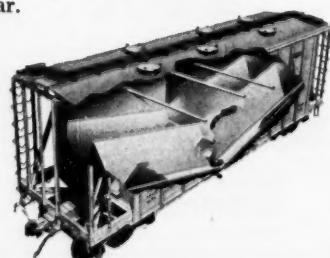


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Right Time to Make Time

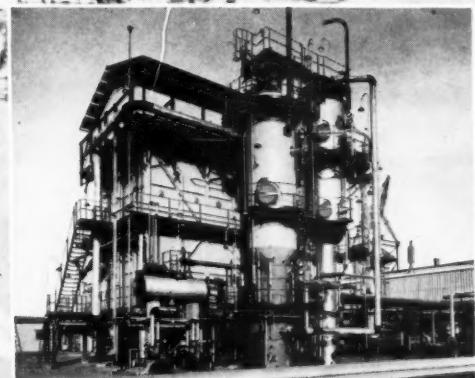
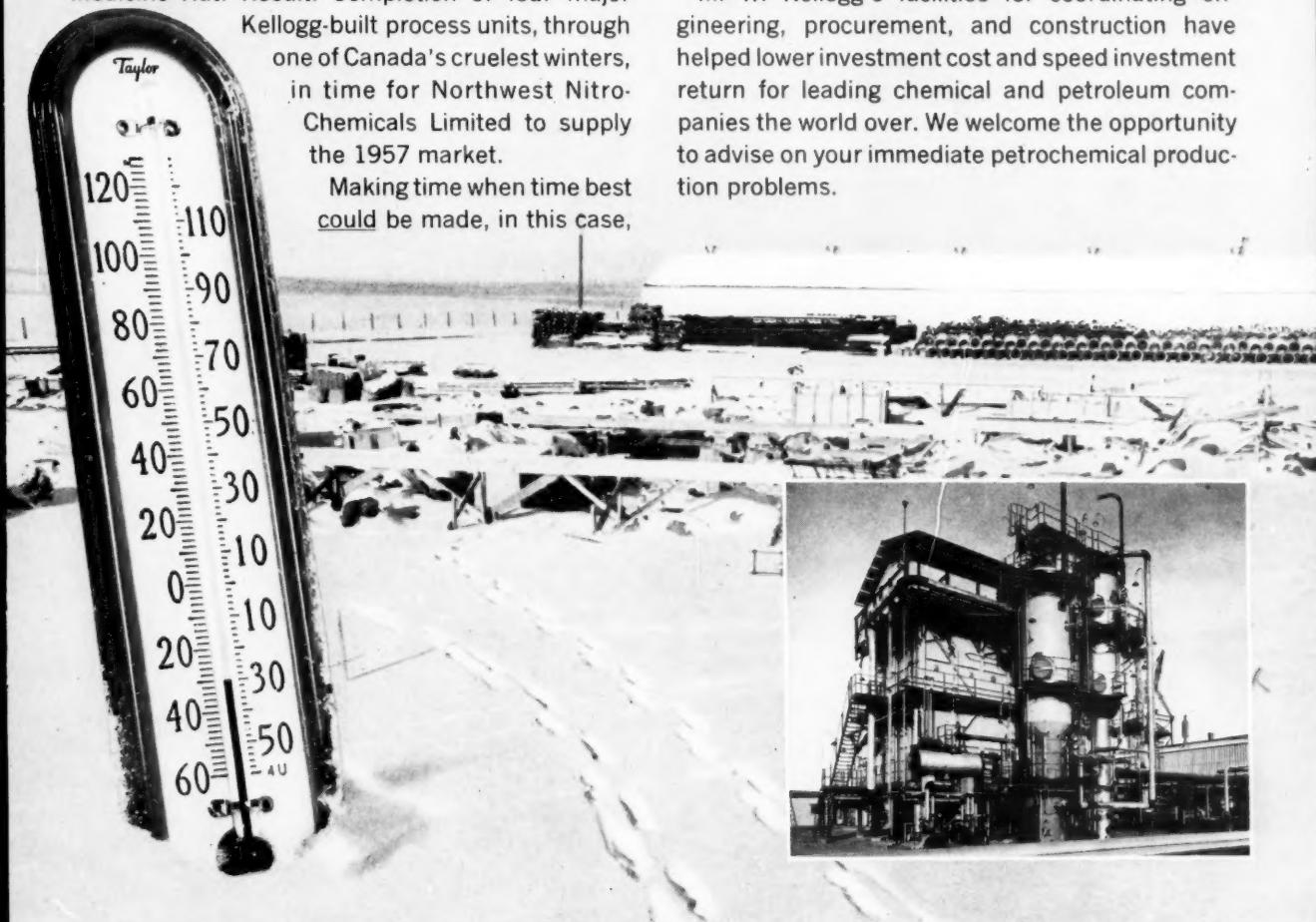
When concrete freezes and cracks at above-zero temperatures, and metal sticks to workers' hands like a magnet, what were Kellogg construction crews doing in Alberta at 30 below? While other building projects were frozen in, The Canadian Kellogg Company Limited was pouring foundations and even welding and fabricating steel pipe and vessels for a multimillion dollar chemical fertilizer plant at Medicine Hat! Result: Completion of four major

Kellogg-built process units, through one of Canada's cruellest winters, in time for Northwest Nitro-Chemicals Limited to supply the 1957 market.

Making time when time best could be made, in this case,

was due to Kellogg's ability to create an environment in which men and equipment could work. Special heating and sheltering equipment, devised by Kellogg, made it possible to capitalize on the seasonal slack in demand for skilled labor. Equally important was Kellogg's ability to have vast quantities of material available on time at the right time, over a period of 12 months, despite weather and distance.

M. W. Kellogg's facilities for coordinating engineering, procurement, and construction have helped lower investment cost and speed investment return for leading chemical and petroleum companies the world over. We welcome the opportunity to advise on your immediate petrochemical production problems.



Kellogg concrete workers and welders were at work even when this photograph was taken in mid-winter. Inset is a section of the Kellogg-designed ammonia unit, which uses Kellogg's steam methane, high pressure reforming process. Other units built by Kellogg, are for sulphuric acid, nitric acid, and ammonium nitrate. This plant for Northwest Nitro-Chemicals Limited is managed and operated by Commercial Solvents Corporation.

CHEMICAL PROCESS DIVISION

THE M. W. KELLOGG COMPANY

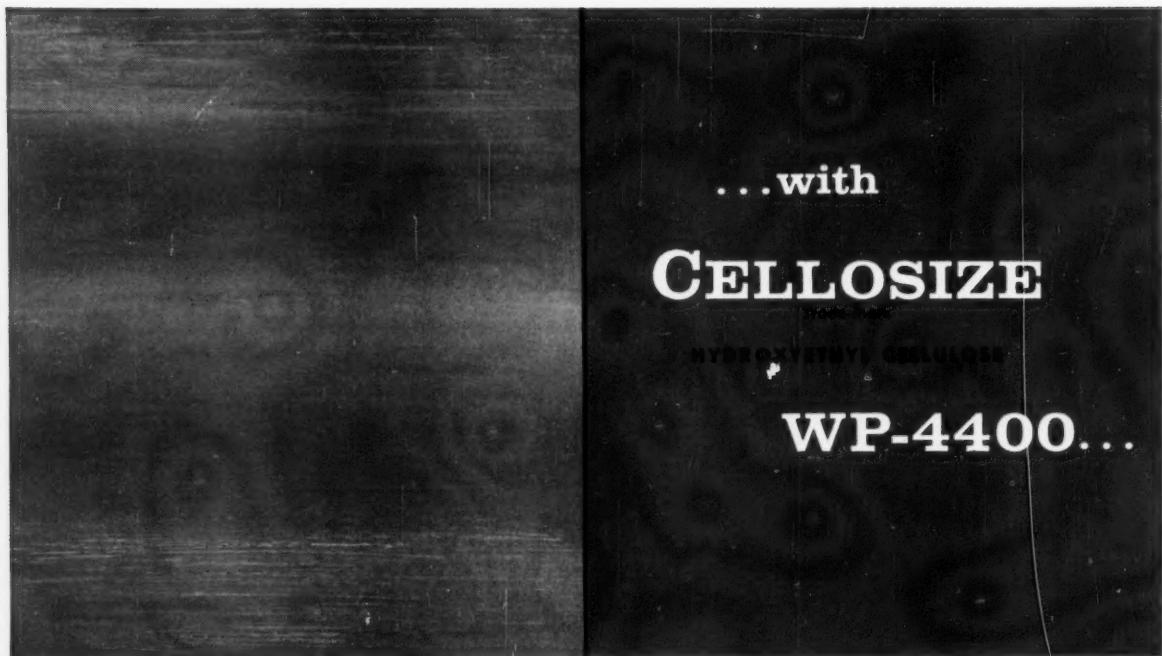
711 THIRD AVENUE, NEW YORK 17, N. Y.

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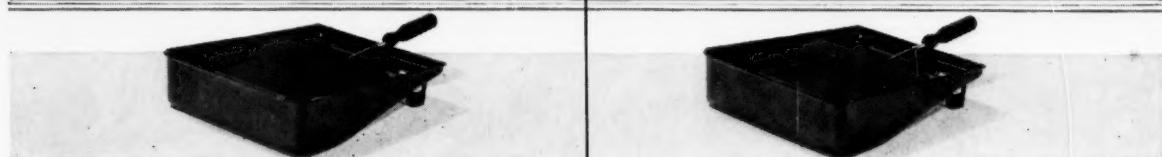


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CELLOSIZE

HYDROXYETHYL CELLULOSE

WP-4400...



Nonionic CELLOSIZE WP-4400 gives clean, bright colors with minimum sheen variation.

a new, nonionic, water soluble thickener

Your search for an excellent, nonionic, water soluble thickener for latex paints is over. The answer: CELLOSIZE Hydroxyethyl Cellulose WP-4400, a free-flowing, white powder. Its viscosity in 2% aqueous solution—3500-5000 cps. Look at the added advantages you get with this excellent thickener—

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- *Goes into solution readily at room temperature—this saves you time and money*
- *Stability in presence of dissolved salts is outstanding*
- *Reduces foaming in mixing kettle*
- *Contributes to mechanical, freeze-thaw and viscosity stability*
- *Won't gel at elevated temperatures*

In Application

- *Contributes to better scrub resistance and washability*
- *Improves brushing, leveling, and flow-out*
- *Gives excellent color values, especially with popular deep decorator colors*
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- *Reduces pinholing*
- *Helps improve hiding power*

Now is the time to get your samples and technical data. Write to Carbide and Carbon Chemicals Company, Room 328, Dept. H, 30 E. 42nd Street, New York 17, New York.

In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.

The term "Cellosize" is a registered trademark of UCC.

